

Vol. I

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1923

No. 34

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO.

No. 35

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, Jr., MAYOR OF SAID CITY AND COUNTY.

No. 36

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, Jr., MAYOR OF SAID CITY AND COUNTY.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE NORTHERN DISTRICT OF CALIFORNIA.

FILED APRIL 15, 1923.

(28,830, 28,831, 28,832)

(28,830, 28,831, 28,832

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1922.

No. 331.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO.

No. 332.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

No. 333.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

**APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE NORTHERN DISTRICT OF CALIFORNIA.**

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VOLUME 1.

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1 In the District Court of the United States in and for the Northern District of California, Second Division.

(No. 27.)

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, Defendant.

Bill of Complaint.

To the Honorable the Judges of the District Court of the United States in and for the Northern District of California, Second Division:

Pacific Gas and Electric Company, the plaintiff herein, brings this its bill of complaint against the City and County of San Francisco, defendant herein, and, for cause of action against the defendant, alleges as follows:

I.

The plaintiff, whose name is Pacific Gas and Electric Company, is now, and ever since the 10th day of October, 1905, has been, a corporation duly organized and existing under and by virtue of the laws of the State of California, and during all of said time has had and still has its office and principal place of business in the City and County of San Francisco, State aforesaid, and, therefore, within the meaning of the Acts of Congress defining the jurisdiction of the Courts of the United States, is a citizen of the State of California.

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II.

The defendant is now and during all of the times herein mentioned has been a political subdivision of the State of California and a municipal corporation duly incorporated, organized and existing under and by virtue of the constitution and laws of the State of California and a charter duly and regularly adopted, approved and

established pursuant to the provisions of the said constitution, and is situate in the Northern Judicial District of California and, therefore, within the meaning of the Acts of Congress defining the jurisdiction of the courts of the United States, is a citizen of the State of California.

III.

The defendant, under and by virtue of the constitution and laws of the State of California and the charter under which it is incorporated, is invested with the power to make and enforce, within its limits, through the agency of its own officers, all local, police, sanitary and other regulations which are not in conflict with general laws, and possesses, subject to the limitations contained in the constitution of the United States of America and the constitution of the State of California, the power to regulate the business of furnishing light, heat and power to itself and its inhabitants, and the power to fix and determine each year, by ordinance to take effect on the 1st day of July in such year, the rates or compensation to be collected by any person or corporation for gas furnished to said City and County and its inhabitants for light and heat purposes, and the power to prescribe the quality of the service rendered by any and all persons engaged in furnishing gas for the purposes aforesaid, and the power to enforce, by its own executive officers and police courts, all ordinances enacted in the exercise of its aforesaid powers. The

3 defendant possesses the power to provide for lighting all of its public buildings and all of the public streets within its boundaries, and the power to compel the plaintiff to furnish all gas required for lighting such buildings and streets at such reasonable rates as defendant by its Board of Supervisors shall from year to year establish.

IV.

The defendant does not own or control any public works for supplying itself or its inhabitants with artificial light, but has for many years provided for lighting with gas many of its public streets and public buildings by making contracts with the plaintiff and its predecessors in interest; and, under and pursuant to such contracts, plaintiff and its predecessors in interest have furnished all gas, labor, lamps and other materials and supplies required for lighting such public streets and buildings; and, under such a contract, the plaintiff is now lighting the defendant's public streets and public buildings and furnishing the gas, lamps, labor, materials and supplies required therefor.

V.

The plaintiff is now and ever since the month of December, 1911, has been engaged in the business of manufacturing, distributing and selling gas to the defendant, City and County of San Francisco, and to its inhabitants for light and heat purposes. The plaintiff is now and ever since the month of December, 1911, has been the

owner and in possession of the franchises of using the public streets and highways in said City and County of San Francisco and of laying and maintaining therein mains and pipes and of making connections therewith and of using such mains and pipes for the purpose of conveying and distributing to said City and County and to its inhabitants gas for light and heat purposes, and of charging and collecting for all gas furnished to said City and County and its

inhabitants reasonable rates or compensation not exceeding
4 the rates or compensation lawfully fixed by the defendant.

The plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain lands situate in said City and County of San Francisco and of certain gas manufacturing plants erected thereon, consisting of machinery and apparatus used for manufacturing, generating, purifying and storing gas and the buildings wherein such machinery and apparatus are housed. The plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain gas distributing systems in said City and County of San Francisco, consisting of mains and pipes laid and maintained in the public streets and highways in said City and County under the authority of the aforesaid franchises and machinery, apparatus and appliances used for forcing into and through said mains and pipes the gas manufactured at the aforesaid plants, and valves, meters and other appliances used for the purpose of regulating and controlling the distribution and delivery of gas and measuring the amounts delivered to its consumers. The plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of divers warehouses which it uses for the purpose of storing appliances, materials and supplies necessary for use in the conduct of its said business, a parcel of land and an office building erected thereon which it uses as a place wherein its officers and employees may transact its business, and a large amount of other property such as materials and supplies and working capital required for use in conducting its said business. All of the plaintiff's plants, systems and other property hereinbefore mentioned are now actually being used by the plaintiff in conducting and transacting its aforesaid business of manufacturing and furnishing gas to the defendant and to its inhabitants; and it is now and will, during the entire year beginning
5 July 1, 1913, and ending June 30, 1914, continue to be necessary for the plaintiff to use all of its aforesaid property in conducting its aforesaid business in order that it may adequately and efficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat.

VI.

The aforesaid franchises owned by the plaintiff are not exclusive: but, under the constitution and laws of the State of California and the defendant's charter, the defendant or any other natural person or corporation having obtained from defendant a grant of the right so to do may establish and operate in competition with the plain-

tiff works for supplying the defendant and its inhabitants with gas for purposes of light and heat.

VII.

Plaintiff's aforesaid gas manufacturing plants and gas distributing systems are of such a nature or character that they are subject to depreciation as the natural result of use, and the action of the elements, and are also subject to obsolescence as the result of new inventions and discoveries and the usual and normal progress and advancement in the arts and sciences relating to the generation and distribution of gas.

VIII.

The demand of defendant City and County and its inhabitants for gas for purposes of light and heat has greatly increased for many years, is now increasing and the plaintiff verily believes will continue to increase. As the result of the greatly increasing demand of the defendant and its inhabitants for gas, the plaintiff and its predecessors in interest have from time to time in the past found it necessary to replace portions of its gas manufacturing plants and
6 gas distributing systems with larger apparatus, mains and appliances because the original apparatus, mains and other appliances had become inadequate for the increased service required by the increasing demand. The loss which the plaintiff and others in like situation must necessarily suffer by reason of the necessity arising periodically of substituting new and larger apparatus, mains and appliances for apparatus, mains and other appliances which, although not obsolete or worn out, have become inadequate as the result of the increased demand for gas is now generally by accountants and public service commissions called "loss from inadequacy" as distinguished from loss arising from depreciation or obsolescence; and the term "inadequacy" wherever used herein is employed to denote loss of this character. All of the plaintiff's gas manufacturing plants and distributing systems are subject to diminution in value as the result of inadequacy as well as from obsolescence and ordinary depreciation.

IX.

Some parts of the plaintiff's aforesaid gas manufacturing plants and gas distributing systems are subject to damage and destruction by fire.

X.

The plaintiff has caused a careful inventory and appraisement of all of its properties in the City and County of San Francisco to be made by competent engineers and others possessed of expert knowledge concerning the matters submitted to them, and has carefully considered said inventory and appraisement and the cost of additions and extensions which have been made subsequent to the making of said inventory and appraisement and is informed and verily believes and therefore says that the present value of the plaintiff's

aforesaid franchises, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in connection with plaintiff's established business is the sum of \$19,386,867.05, and that the average value thereof during the year beginning July 1, 1913, and ending June 30, 1914, will be the sum of \$19,937,267.05.

XI.

The plaintiff having carefully investigated and considered the inventory and appraisalment of its property above mentioned is also informed and verily believes and therefore says that the present reproduction value of that portion of the aforesaid property which is subject to depreciation and to diminution of value resulting from obsolescence and inadequacy consisting of the aforesaid gas manufacturing plants and distributing systems, that is to say, the value thereof measured by the cost of replacing said gas manufacturing plants and distributing systems with new plants of the same kind, capacity and efficiency, is the sum of \$13,402,270.83; and that during the year beginning July 1, 1913, it will have to make and will make additions, extensions and improvements of said plants and systems for the purpose of meeting the demands of the defendant and its inhabitants for gas, and that the cost of such additions, extensions and improvements will not be less than the sum of \$1,100,800.00, and that, as the result of the making of such additions, extensions and improvements, the average reproduction value of the property constituting said plants and systems during the year beginning July 1, 1913, will be the sum of \$13,952,670.83.

XII.

A committee of the defendant's Board of Supervisors held divers hearings during the months of February, March, April, May and June, 1913, and at said hearings the plaintiff introduced statements verified by the oath of its proper officers and oral evidence to prove the value of its aforesaid property, the necessity of the use of said property for furnishing the defendant and its inhabitants with gas, the cost of manufacturing and distributing gas to the defendant and its inhabitants during the year beginning July 1, 1913, the amount of gas which would be demanded and purchased by the defendant and its inhabitants during said year and other pertinent facts to enable said Board to ascertain and determine what will constitute a reasonable return or compensation to be paid by the defendant and its inhabitants for gas furnished to them by the plaintiff; and thereafter the defendant, acting by its Board of Supervisors, enacted an ordinance on the 23rd day of June, 1913, which was approved by the defendant's Mayor on the 26th day of June, 1913, and went into effect on the 1st day of July, 1913, fixing and establishing the quality and illuminating power of gas to be furnished to the defendant and its inhabitants and the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate

and price to be charged for such gas during the year commencing July 1, 1913, and ending June 30, 1914. A true copy of the last mentioned ordinance is hereunto annexed, marked "Exhibit D" and made a part hereof. At the final hearing before the said Board of Supervisors and before the adoption of said ordinance the plaintiff protested that the rate of seventy-five (75) cents per thousand cubic feet would be insufficient to afford to the plaintiff just or reasonable compensation for the gas to be furnished to the defendant and its inhabitants during said year, and that an ordinance establishing such a rate would be confiscatory, unconstitutional and void.

XIII.

The rate or compensation fixed by the aforesaid ordinance viz, seventy-five (75) cents per thousand cubic feet of gas, is not now and will not at any time during the year beginning July 1, 1913, be just compensation for gas of the quality and illuminating power prescribed by said ordinance, and is not now, and will not at any time during said year be, sufficient to afford to the plaintiff reasonable or just compensation for the use of plaintiff's aforesaid property in addition to the actual cost of manufacturing, distributing and selling such gas to the defendant and its inhabitants. The plaintiff, having by its officers and agents, carefully investigated the facts and estimated the amount of gas which will probably be purchased

9 by the defendant and its inhabitants during the said year beginning July 1, 1913, and the cost of manufacturing, distributing and selling the same, including the expense to be incurred in maintaining its aforesaid plants, systems and property and the amounts of money which should be set aside from its revenues as reserve funds to cover losses resulting from fire, casualties, depreciation, obsolescence, inadequacy, and contingencies, is informed and verily believes and therefore says,

1. The entire revenue which it will receive from the conduct of its said business and the use of its said property during the year beginning July 1, 1913, and ending June 30, 1914, if it shall not be permitted to charge and collect from the defendant and its inhabitants more than seventy-five (75) cents per thousand cubic feet for the gas to be furnished by it, will not exceed the sum of \$3,447,045.36
2. The total amount of the expense which will actually be incurred by the plaintiff in conducting its said business and in operating its said gas manufacturing plants and distributing systems during the year beginning July 1, 1913, exclusive of the cost of replacements which will actually be made and the amounts of money which should be set aside from its revenue as reserve funds to cover actual depreciation and probable losses to result from fire, casualties, obsolescence, inadequacy and contingencies, will not be less than the sum of \$2,295,506.32

3. A reasonable amount for the plaintiff to set aside from its revenues during the year beginning July 1, 1913, and ending June 30, 1914, to provide a fund to cover depreciation and probable losses in the conduct of its said business and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence, inadequacy and contingencies during said year beginning July 1, 1913, and ending June 30, 1914, will not be less than the sum of..... \$675,321.82
- 10 4. The net income which the plaintiff will derive from the use of all of its aforesaid property and from the conduct of its business of manufacturing, distributing and selling gas to the defendant and its inhabitants for said year beginning July 1, 1913, will not exceed the sum of..... \$476,217.22
5. Said net income will not exceed two and thirty-nine hundredths (239) per cent. of the value of the plaintiff's aforesaid property which will be actually and necessarily used by the plaintiff in manufacturing, distributing and selling gas to the defendant and its inhabitants during said year beginning July 1, 1913.

XIV.

The several items which make up the aggregate amounts of the plaintiff's estimated revenues, expenses and reserves for the year beginning July 1, 1913, and ending June 30, 1914, set forth in the last preceding paragraph of this complaint, are shown in a statement of the estimated revenues and costs of the plaintiff's gas department in said City and County of San Francisco, which is annexed hereto, marked "Exhibit A" and made a part hereof. The estimates set forth in said statement are based upon the following assumptions, viz:

1. That the rate per thousand cubic feet of gas sold to defendant's inhabitants will be seventy-five cents, and that the compensation to be received from defendant for gas lighting service will be as fixed by contract now existing;
2. That the demand of the defendant and its inhabitants for gas has increased from the 1st day of January to the present time, and will increase from the present time to the 30th day of June, 1914, at the same rate as such demand increased during the calendar year ending December 31, 1912, and that the total amount of gas to be sold and delivered by the plaintiff to the defendant and its inhabitants during the year beginning July 1, 1913, and ending June 30, 1914, will be 4,380,720,500 cubic feet;
- 11 3. That the plaintiff's expenses and reserves for maintaining its capital during the year beginning July 1, 1913, will increase only in proportion to the actual increase of the capital in-

vested in those parts of its said plants and systems which are subject to loss or diminution in value by fire, wear, action of the elements, obsolescence, inadequacy and contingencies;

4. That plaintiff's other expenses and reserves for casualty insurance will increase in proportion to the increase in the quantity of gas to be produced and sold by it to the defendant and its inhabitants during said year beginning July 1, 1913; and

5. That, during the year beginning July 1, 1913, wages of labor and prices of materials, and supplies to be used by plaintiff in its said business will be the same as they were during the calendar year 1912.

The plaintiff is informed and verily believes and therefore says that the aforesaid assumptions are conservative and are supported by facts and by the experience of its officers who are now, and for many years have been, familiar with the business of manufacturing, distributing and selling gas in said City and County of San Francisco, and that it is probable that wages and the prices of some of said materials and supplies will be higher during the year beginning July 1, 1913, than they were during the calendar year 1912.

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XV.

The plaintiff, in support of the estimates set forth in the last two preceding paragraphs of this complaint and in said "Exhibit A," declares that it was permitted by the ordinances of defendant then in force to charge and did charge the price of eighty (80) cents per thousand cubic feet during the first half, and the price of seventy-five (75) cents per thousand cubic feet during the second half, of the calendar year beginning January 1st and ending December 31, 1912, for the gas sold by it to the defendant and its inhabitants; and that its gross revenue, expenses and reserves during said calendar year are correctly shown in the statement which is hereunto annexed marked "Exhibit B" and made a part hereof.

XVI.

Annexed hereto, marked "Exhibit C" and made a part hereof is a statement showing the several classes and, according to the best of plaintiff's information and belief, the value of the plaintiff's property and capital which will be used by it in conducting its aforesaid business of manufacturing and furnishing gas to the defendant and its inhabitants during the year beginning July 1, 1913.

XVII.

Plaintiff is informed and believes and therefore says that the item of \$33,195.56 shown in said "Exhibit A" as a reserve for fire insurance for the year beginning July 1, 1913, does not exceed what it would cost plaintiff during said year to insure, at the rates now prevailing in San Francisco, in responsible fire insurance companies

against loss and damage by fire so much of its aforesaid property as is subject to destruction or damage by fire. The plaintiff is not now insuring its property against loss or damage by fire, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover fire losses. The plaintiff is informed and believes and therefore says that the reserve for fire insurance shown in said "Exhibit A" is reasonable and is based upon conservative estimates of fire risks.

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XVIII.

The plaintiff is informed and believes and therefore says that the item of \$61,695.15 shown in said "Exhibit A" as a reserve for casualty insurance for the year beginning July 1, 1913, does not exceed what it would cost plaintiff during said year to insure at the rates now prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries. The plaintiff is not now carrying casualty insurance, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover liability to its employees and the public for personal injuries. The plaintiff is informed and believes and therefore says that the reserve for casualty insurance shown on said Exhibit A is reasonable and is based upon conservative estimates of casualty risks.

XIX.

Plaintiff has caused a careful investigation and estimate to be made by skilled valuation engineers for the purpose of ascertaining the average annual rate of depreciation of the component parts of its aforesaid gas manufacturing plants and distributing systems resulting naturally from use and wear and the action of the elements and has been informed by said engineers and verily believes and therefore says that the average annual rate of depreciation of said plants and systems resulting from use, wear and the action of the elements is 2.66 per cent of the reproduction value of said entire gas manufacturing plants and distributing systems, and that the item of \$371,141.05 shown in said "Exhibit A" as a reserve for depreciation is 2.66 per cent of the average reproduction value of the property which will constitute said gas manufacturing plants and distributing systems during the year beginning July 1, 1913, as shown in paragraph XI of this complaint, and is a reasonable and conservative amount for the plaintiff to reserve annually from its revenues as a fund for the replacement from time to time of parts of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements.

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XX.

Plaintiff is informed and verily believes and therefore says that the item of \$209,290.06 shown in said "Exhibit A" as a reserve for obsolescence, inadequacy and contingencies is a reasonable and

proper amount to set aside as a fund to cover probable losses resulting from obsolescence of parts of its said plants and systems and inadequacy as hereinbefore defined and probable losses resulting from inevitable accident, extraordinary action of the elements, such as violent storms of wind and rain and earthquakes, and losses caused by acts of violence, riots and war, and amounts only to one and one-half per cent. of the average reproduction value of the property which will constitute the said gas manufacturing plants and distributing systems during the year beginning July 1, 1913.

XXI.

The component parts of plaintiff's aforesaid gas manufacturing plants and distributing systems are continually wearing out by use and diminishing in value by the ordinary action of the elements, and from time to time become obsolete and inadequate and have to be repaired and replaced. From time to time plaintiff's said plants and systems have been and will hereafter be damaged and parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence. A portion only of the loss and damage which the plaintiff sustains as a result of the causes mentioned in this paragraph can be remedied by ordinary current repairs and replacements which are made from time to time out

15 of plaintiff's current revenues and the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless or inefficient or have been destroyed. For the reasons set forth in this paragraph it is necessary, in order that the plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to the defendant and its inhabitants, that the plaintiff shall set aside annually out of its revenue a sufficient fund to provide not only for current repairs and replacements, but also for periodical replacements. The plaintiff has from time to time in the past repaired and replaced and is now from time to time repairing and replacing the component parts of its aforesaid plants and systems and has kept and is keeping the same in good condition and repair. The plaintiff's aforesaid plants and systems are now adequate and efficient for supplying the present demand of the defendant and its inhabitants with gas and have been constructed and maintained prudently and economically. It is the duty of the plaintiff to maintain its said plants and systems in good order and condition so that the same shall at all times be adequate and efficient for serving the defendant and its inhabitants with gas and from time to time to replace parts thereof and to make extensions, additions and betterments to meet the increased demand of the defendant and its inhabitants. As against the defendant in the exercise of the latter's power to fix the compensation to be charged and collected by the plaintiff for gas furnished to the defendant and its inhabitants, plaintiff has the right to charge and collect for all gas furnished and sold by it to them such compensa-

tion as will enable the plaintiff, not only to pay the expenses actually incurred by it in manufacturing and distributing gas, but also to set aside from its revenue and maintain reserve funds sufficient to provide for losses occasioned by wear and ordinary action of the elements and contingent or probable losses occasioned by
 16 fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war and a reasonable annual return or profit upon the capital invested by the plaintiff in said plants, systems and business. If the plaintiff shall be allowed to collect rates or compensation only sufficient to enable it to pay the cost of manufacturing and distributing gas to the defendant and its inhabitants, including in such cost operating expenses, current expenses for repairs and maintenance, taxes and a reasonable income or return upon its capital invested in its aforesaid plants, systems and business, and shall not be allowed to collect in addition thereto an amount sufficient to make adequate provision for periodical and contingent loss and damage resulting from causes hereinbefore specified, then when said plants and systems shall have become worn out, obsolete or destroyed, the plaintiff will have received from the defendant and its inhabitants only reasonable income upon its capital invested and its capital will have been consumed or destroyed in the service of the defendant and its inhabitants and the defendant and its inhabitants will have appropriated and taken for their own use plaintiff's entire invested capital and the use thereof, but will have paid for nothing except such use.

XXII.

Plaintiff in conducting its business of manufacturing and distributing gas to the defendant and its inhabitants necessarily employs a large number of officers, engineers, mechanics, and other skilled men and also unskilled laborers for whose acts in the course of their employment it is responsible. Plaintiff in conducting its said business at all times exercises a high degree of care in the employment and supervision of all of the men employed by it and in the conduct of its business; but, nevertheless, in the conduct of its said business and in the operation of its gas manufacturing plants and distributing systems, casualties do occur from time to time which result in injury to its employees, its consumers
 17 and to other persons under circumstances which give rise to legal liability on the part of the plaintiff for the damage caused by such injury. For these reasons it is necessary for the plaintiff to set aside from its revenue and to charge as a part of the cost of manufacturing and distributing gas to the defendant and its inhabitants a reasonable and sufficient sum annually to enable it to discharge all liabilities arising from the causes mentioned in this paragraph of this complaint.

XXIII.

The plaintiff in conducting its aforesaid business necessarily hazards its invested capital in the same way and to the same extent as any other person who invests capital in business. Neither the defendant nor its inhabitants nor the State of California in any manner indemnifies or undertakes to indemnify the plaintiff against loss of capital or loss of income suffered in the conduct of the plaintiff's said business. If the plaintiff's business of manufacturing and distributing gas to the defendant and its inhabitants at rates established by itself or by the defendant shall prove unprofitable and if the income derived from such business shall not be sufficient to compensate plaintiff fully for the entire cost of manufacturing and distributing such gas, the loss resulting will have to be borne by the plaintiff, and the plaintiff has not the right of recouping such loss by charging the defendant or its inhabitants at any time any more than such reasonable rates for gas as shall be established by or under authority of the latter.

XXIV.

18 The plaintiff, ever since it acquired its aforesaid gas manufacturing plants and distributing systems, has conducted and is now conducting and will continue to conduct its business of manufacturing, distributing and selling gas to the defendant and its inhabitants economically and prudently and is now maintaining and will continue to maintain its said plants and systems prudently and economically; and all of the estimates hereinbefore set forth of the revenues to be derived by the plaintiff from the conduct of its aforesaid business and the use and operation of the aforesaid plants and systems and of all of the cost of manufacturing, distributing and selling gas to the defendant and its inhabitants and of making provision for the maintenance and preservation of its said plants and systems are based upon the assumption that the plaintiff will act prudently and economically in the conduct of its said business and in the maintenance and preservation of its plants and systems.

XXV.

At no time during the past year has it been possible for the plaintiff to borrow upon the security of its aforesaid property more than seventy-five (75) per cent. of its present value, or at a lower rate of interest than six and one-tenth per cent per year, and at the present time plaintiff can not borrow upon the security of its aforesaid property money required for extensions, additions or betterments at a lower rate of interest than seven (7) per cent. per year. Money can not be borrowed at the present time upon terms as favorable as those already mentioned in this paragraph of this complaint except by corporations or persons who can show that they derive from the use of the property hypothecated as security and from the

conduct of their business a net profit amounting to at least one and one-half times the entire amount of interest payable upon the money borrowed upon such security. The plaintiff further shows
 19 that the prevailing rate of interest in said City and County of San Francisco for money loaned upon good real estate security to an amount not exceeding sixty (60) per cent. of the value thereof is at the present time, and probably will continue to be for at least one (1) year to come, not less than six (6) per cent. net, the borrower paying all taxes and other charges.

XXVI.

The plaintiff is informed and believes and therefore says that a net profit of ten (10) per cent. per year upon the value or its aforesaid property, after paying all actual expenses of manufacturing, distributing and selling gas and after making reasonable provision for depreciation and contingent and probable losses resulting from fire, casualties, obsolescence, inevitable accident, violence, riots and war, is the minimum profit that will be reasonable compensation for the use of the plaintiff's aforesaid property and for the service rendered by the plaintiff in conducting its said business under existing conditions; and plaintiff further says that, under existing conditions, any law or ordinance or governmental act fixing rates to be charged by the plaintiff for gas to be manufactured, distributed and sold by it to the defendant and its inhabitants which will not permit the plaintiff to earn by the use of its aforesaid plants, systems and property and from the conduct of its business a net profit of at least ten per cent. per year upon the value of such plants, systems and property, over and above the cost of operation and maintenance and a reasonable allowance for actual depreciation and reasonable allowances or reserves to cover contingent or probable losses due to obsolescence, inadequacy, fire, casualties, extraordinary action of the elements, inevitable accident, acts of violence, riots, and war, will operate to deny to the plaintiff the
 20 equal protection of the laws and to deprive the plaintiff of its property and the use thereof without just compensation and without due process of law in violation of the fourteenth amendment to the Constitution of the United States of America.

XXVII.

The plaintiff is informed, verily believes and therefore says that the defendant, unless restrained by order of this court from enforcing the aforesaid ordinance, will compel the plaintiff to furnish to the defendant's inhabitants throughout the entire year beginning July 1, 1913, gas of the quality and illuminating power prescribed by said ordinance and at the price fixed thereby, namely, seventy-five (75) cents per thousand cubic feet, and thereby the State of California, acting by the defendant as one of its governmental agencies, will deprive plaintiff of its property and of the use thereof without just or reasonable compensation and without due process of law, and will

deny to the plaintiff the equal protection of the laws, and that the aforesaid ordinance is repugnant to and in violation of the fourteenth amendment to the Constitution of the United States of America and therefore null and void.

XXVIII.

The defendant herein has threatened and is now threatening to enforce immediately and continuously the aforesaid ordinance and all the provisions thereof, and is threatening, by means of criminal proceedings in its police courts and otherwise, to compel the plaintiff to furnish gas to the defendant's inhabitants at the rate of seventy-five (75) cents per thousand cubic feet. The plaintiff is informed and believes and therefore says that, if the plaintiff shall refuse or fail to comply with the provisions of said ordinance, or to supply gas to the defendant or to its inhabitants at rates not exceeding the maximum prescribed by said ordinance, the defendant will,

21 through its officers and agents, unless restrained by order of this court, institute many hundreds of actions in its police courts against the plaintiff, its officers and agents to enforce the penalties prescribed by section 7 of said ordinance, and that, unless the defendant shall be restrained by this Court, many of the inhabitants of the defendant will, in case of the plaintiff's refusing to furnish them with gas at a rate not exceeding the rate prescribed by said ordinance, institute many suits and actions at law to compel the plaintiff to furnish them with gas at the rate prescribed by said ordinance, and to recover the penalties prescribed by section 629 of the Civil Code of California, viz., fifty dollars (\$50.00) and five dollars (\$5.00) per day for every day that the plaintiff shall continue to refuse to furnish any applicant with gas at the rate prescribed by said ordinance, and that the plaintiff will thereby be irreparably damaged and subjected to a multiplicity of suits and proceedings at law.

XXIX.

The plaintiff is advised by its solicitors and therefore says that there is no remedy except in equity for a complete determination of the invalidity of the aforesaid ordinance and for the protection of the plaintiff from being deprived of its property without due process of law and from the denial of its right to the equal protection of the laws by the threatened enforcement of said ordinance; and the plaintiff further says that, in the absence of the remedy of injunction afforded by courts of equity, the said ordinance would be enforced by the defendant in violation of plaintiff's rights under the provisions of the fourteenth amendment of the Constitution of the United States of America, on which account the plaintiff invokes the jurisdiction of this court to protect it against the threatened enforcement of the said ordinance and the threatened deprivation of its property without due process of law, and the threatened denial of its rights to the equal protection of the laws in violation of the Constitution of the

22 United States of America.

XXX.

The matter in dispute in this action exceeds, exclusive of interest and costs, the sum or value of three thousand dollars (\$3,000.00).

XXXI.

In support of its prayer for a restraining order pending the hearing upon an order to show cause why a temporary injunction should not be issued pending the final determination of this suit, the plaintiff shows that it has been and now is the practice of the plaintiff to furnish gas to the defendant and its inhabitants upon one month's credit in all cases where they request it so to do and give adequate security or establish their credit to the plaintiff's satisfaction; that more than 90,000 of the defendant's inhabitants are now being furnished by the plaintiff with gas upon one month's credit at the rate prescribed by said ordinance; that unless a temporary restraining order shall be issued out of this court upon the filing of this complaint, the plaintiff will be subjected to the penalties prescribed by the aforesaid ordinance, unless it shall accept payment at the rate of seventy-five (75) cents per thousand cubic feet for gas furnished subsequent to June 30, 1913, as prescribed by said ordinance, and the plaintiff will be unable to collect for such gas any greater compensation than the rate prescribed by said ordinance; and that plaintiff is now being deprived of its property and denied the equal protection of the laws and, until the issuance of an injunction pendente lite herein, will be deprived of its property and denied the equal protection of the laws continuously by the operation of the aforesaid ordinance and the defendant's threatened enforcement thereof in violation of the fourteenth amendment of the Constitution of the United States of America, and is suffering and will continue to suffer, until the enforcement of said ordinance shall be enjoined by this court, immediate and irreparable loss and damage.

To the end therefore that the plaintiff may have that relief which it can only obtain in a court of equity, and that the defendant may answer the premises and all and singular the allegations herein contained (but not upon oath or affirmation, the benefit whereof is hereby expressly waived by the plaintiff) the plaintiff now prays:

1. That it be adjudged and decreed that the aforesaid ordinance is void and without force or effect, because in contravention of the fourteenth amendment to the Constitution of the United States of America, in that the said ordinance, if enforced, will operate to deprive plaintiff of its property without due process of law and to deny to plaintiff the equal protection of the laws.
2. That it be adjudged and decreed that plaintiff has no adequate remedy at law for the injury and damage which would result to it from the threatened enforcement of said ordinance, and that such injury and damage would be irreparable.

3. That it be adjudged and decreed that plaintiff be granted writs, both temporary and permanent, of injunction, issuing out of and under the seal of this Honorable Court, against the defendant, enjoining and restraining it and all persons acting by or under its authority as officers, agents, servants, employees, or otherwise from in any way enforcing or attempting to enforce the said ordinance or any of the provisions thereof; and that, under and by virtue of the provisions of section 263 of the Judicial Code of the United States, a restraining order may be granted against the defendant, its officers, agents, servants and employees, restraining them as hereinbefore stated, until this Honorable Court shall determine, upon motion and hearing, whether a temporary injunction of like purport and tenor as hereinbefore prayed for shall not be granted pendente lite.

4. Plaintiff further prays that, if at any time hereafter and prior to the final hearing hereof, any person or persons shall attempt to enforce the provisions of said ordinance, or otherwise to act or proceed thereunder, such person, or persons, or some of them on behalf of all, be made parties defendant herein, and each of them be enjoined and restrained as hereinbefore prayed; and that plaintiff have such further or other or different relief as to the Court may seem meet and the nature of the case may require.

5. Plaintiff further prays that this Honorable Court grant unto the plaintiff a writ of subpoena ad respondendum issuing out of and under the seal of this Honorable Court to be directed to said defendant commending it on a certain day and under a certain penalty to be therein inserted, to appear before your Honors in this Honorable Court, and then and there full, direct, true and perfect answers make to all and singular the premises (but not upon oath or affirmation, the benefit whereof is hereby expressly waived by plaintiff); and further to stand, do, perform and abide by such order and decree as to your Honors may seem meet, and also that a writ of provisional injunction to the same purport, tenor and effect as hereinbefore set forth and appears be granted during the pendency of this action; and plaintiff will ever pray, etc.

PACIFIC GAS AND ELECTRIC
COMPANY,

By JOHN A. BRITTON,
Its Vice-President and General Manager.
WM. B. BOSLEY,
C. P. CUTTEN,
Solicitors for Complainant.

25 UNITED STATES OF AMERICA,
Northern District of California,
City and County of San Francisco, ss:

John A. Britton, being first duly sworn, deposes and says: That he is one of the vice-presidents and the general manager of the Pacific Gas and Electric Company, a corporation, which is the plaintiff

named in the above and foregoing bill of complaint, and which has subscribed to the same; and that the said bill of complaint and all and singular the allegations therein contained are true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said corporation.

JOHN A. BRITTON.

Subscribed and sworn to before me, this 17 day of July, 1913.

R. J. CANTRELL, [Notarial Seal.]
Notary Public of the State of California,
in and for the City and County of San Francisco.

EXHIBIT "A."

Pacific Gas and Electric Company.

San Francisco District.

Statement of Estimated Revenues and Costs.

Gas Department.

July 1, 1913, to June 30, 1914.

(Estimate Based on Results of Year 1912.)

Gross Revenue:

Sales of Gas in San Francisco—

Municipal Street Lighting.....	\$92,399.02
Lighting Municipal Buildings.....	11,652.18
Commercial Metered Lighting.....	3,166,514.40
Municipal Street Lighting Expense.....	98,719.95
Gas Meter Rents.....	20,733.64
Rental of Gas Arcs.....	23,905.98
Sales of Gas to other Departments.....	33,120.19

Total Gross Revenue..... 3,447,045.36

Average cost
per M. C. F.

Maintenance of Generating Capital.....	63,856. 94	.....	.014191
Maintenance of Distribution Capital.....	189,856. 06	.....	.043319
Generating Expenses.....	983,109. 37	.....	.218490
Distribution Expenses.....	671,331. 32	.....	.153027
Taxes.....	165,617. 20	.....	.036812
Floating Debt Interest.....	3,249. 14	.....	.000722
Uncollectible Accounts.....	30,939. 35	.....	.006876
Administrative Expenses.....	187,546. 94	.....	.041681
Total Expenses		2,295,506. 32	<u>.515118</u>

Reserves:

Fire Insurance.....	33,195. 56	.....	.007378
Casualty Insurance.....	61,695. 15	.....	.013712

Annual Amortization of Depreciable Capital:

Depreciation.....	371,141. 05	.....	.082490
Obsolescence, Inadequacy, Contingencies, etc.....	209,290. 06	.....	.046511
Total Costs	675,321. 82	2,970,828. 14	<u>.665209</u>
Net Income—July 1, 1913, to June 30, 1914.....		476,217. 22	<u>.100934</u>

NOTE.—The foregoing statement does not include any expenditure for replacements of Property or additions, improvements, and betterments thereto.

Pacific Gas and Electric Company.

San Francisco District.

Statement of Revenues and Costs.

Gas Department.

Year 1912.

		Average per M.
Gross Revenue:		
Sales of Gas in San Francisco.....	3,000,584.34	.777907
Municipal Street Lighting Service.....	86,916.67	
Rental of Gas Area.....	21,047.70	
Sales of Gas to other Departments.....	29,167.07	.279571
Total Gross Revenue.....	3,137,715.78	.792036
Expenses:		
Maintenance of Generating Capital.....	56,221.99	.014191
Maintenance of Distribution Capital.....	167,156.24	.043319
Generating Expenses.....	865,565.57	.218490
Distribution Expenses.....	591,064.74	.153027
Taxes.....	127,170.72	.032101
Floating Debt Interest.....	2,860.66	.000722
Uncollectible Accounts.....	27,240.14	.006876
Administrative Expenses.....	165,123.21	.041681
Total Expenses.....	2,002,403.27	.510407

Reserves:

Fire Insurance	33,195.56	.....	.008379
Casualty Insurance	54,318.67	.....	.013712

Annual Amortization of Depreciable Capital:

Depreciation	333,633.39	.....	.084217
Obsolescence, Inadequacy, Contingencies, etc.	188,139.14	.....	.047491
	<hr/>		<hr/>
Total Costs	609,286.76	2,611,690.03	.664206
	<hr/>	<hr/>
Net Income—Year 1912 .....	.....	526,025.75	.127830

NOTE.—The foregoing statement does not include any expenditure for replacements of Property or additions, improvements, and betterments thereto.

Pacific Gas and Electric Company.

San Francisco District.

Statement of Capital.

Non-landed Capital:

1. General Capital December 31, 1912.....
- Proportion allotted to Gas Department on basis of gross business done in 1912
—53.56%
2. Generating Capital December 31, 1912.....
3. Transmission and Distribution Capital December 31, 1912.....

\$161,486. 63

86,492. 24
3,686,291. 60
9,234,176. 99

Landed Capital:

4. All Departments—December 31, 1912.....
- Proportion allotted to Gas Department on basis of gross business done in 1912
53.56%
5. Gas Department only.....

286,646. 00

153,527. 60
753,886. 00

Other Capital:

6. Working Capital
7. Estimated Construction January 1, 1913, to June 30, 1913.....
8. Estimated Construction July 1, 1913, to June 30, 1914.....
9. Average amount in the service of the public during the year, for which rates
are to be fixed, namely, 50%.....
10. Organization and development expenses and Going concern value.....
11. Value of Franchises.....

676,433. 11
395,310. 00

1,100,800. 00

550,400. 00
2,918,107. 81
1,482,641. 70

Total..... 19,937,267. 05

Ordinance No. 2348 (New Series).—Fixing the Minimum Standard Quality and Illuminating Power of Gas and the Maximum Rate and Price to be Charged Therefor, for the Year Commencing July 1, 1913, and Ending June 30, 1914.

Be it Ordained by the People of the City and County of San Francisco, as follows:—

Section 1. The minimum standard quality and illuminating and heating power of gas to be furnished by any person, firm or corporation to be used in the City and County of San Francisco, is hereby established at nineteen (19) candles, with a minimum heat value of 600 British thermal units.

The pressure shall not be less than two (2) inches nor more than nine (9) inches of water in height against the atmospheric pressure, said candle and heating power and pressure to be determined by the Board of Public Works of the City and County of San Francisco.

Section 3. The maximum rate and price to be charged and collected therefor from consumers by any such person, firm or corporation for the year commencing July 1, 1913, and ending June 30, 1914, is hereby fixed and established at Seventy-five (\$.75) Cents per one thousand cubic feet.

Section 2. The maximum rate and price to be charged by any person, firm or corporation for furnishing gas for lighting public buildings for the year commencing July 1, 1913, and ending June 30, 1914, is hereby fixed at Seventy-five (\$.75) Cents per one thousand cubic feet.

Section 4. The maximum rate and price to be charged by any person, firm or corporation for furnishing incandescent gas lamps for lighting the public streets, parks or squares for the year commencing July 1, 1913, and ending June 30, 1914, is hereby fixed at Eight (8) Cents per lamp per night, including care, lighting and extinguishing, each lamp to be kept burning from thirty (30) minutes after sunset until thirty (30) minutes before sunrise on the next day, and the number of such gas lamps may be increased or diminished by the Board of Supervisors, and subject to any moonlight schedule the Board may adopt, provided that the price of incandescent gas lamps of three lights each is hereby fixed at Fifteen (15) Cents a cluster lamp per night.

Section 5. The maximum rate and price to be charge by any person, firm or corporation for furnishing gas for heating purposes for the year commencing July 1, 1913, and ending June 30, 1914, is hereby fixed at Seventy-five (75) Cents per one thousand cubic feet.

Section 6. All ordinances and parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

Section 7. Any person, firm or corporation, or any officer or agent of any person, firm or corporation violating any of the provisions of this ordinance shall be deemed guilty of misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred (\$500) dollars, or by imprisonment not exceeding six (6) months, or by both such fine and imprisonment, and such person, firm or corporation, or officer or agent of any such person, firm or corporation, shall be guilty of a separate offense for every day that such violation shall continue, and shall be subject to the penalty imposed by this section for each and every separate offense.

Section 8. This Ordinance shall take effect and be in force on the first day of July, 1913.

Finally Passed—Board of Supervisors, San Francisco, June 23, 1913.

Ayes: Supervisors Caglieri, A. J. Gallagher, G. E. Gallagher, Hayden, Hilmer, Hocks, Jennings, Koshland, Mauzy, McCarthy, McLeran, Murphy, Nolan, Payot, Vogelsang.

Absent: Supervisors Bancroft, Giannini, Murdock.

JOHN W. ROGERS,

Acting Clerk.

Approved, San Francisco, June 26, 1913.

JAMES ROLPH, JR.,

Mayor.

Endorsed: Filed July 18, 1913. W. B. Maling, Clerk.

31 In the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation
Defendant.

Answer.

To the Honorable the Judges of the District Court of the United States in and for the Northern District of California, Second Division:

Now comes the City and County of San Francisco, a municipal corporation, the defendant herein, and for answer to plaintiff's complaint herein admits, denies and alleges as follows:

I.

Defendant admits the allegations in paragraphs 1, 2, 3 and 4 of plaintiff's complaint.

II.

Defendant admits that since the month of December 1911, plaintiff has been engaged in the business of manufacturing, distributing and selling gas to the defendant, City and County of San Francisco and to its inhabitants, for light and heat purposes, but denies that plaintiff is now or ever has been the owner and in possession of the franchises of using the public streets and highways in said City and County of San Francisco, or of laying and maintaining therein mains and pipes, or of making connections therewith or of using such mains and pipes for the purpose of conveying and distributing to said City and County of San Francisco or to its inhabitants gas for light and heat purposes, or of charging and collecting for all gas furnished to said City and County and its inhabitants reasonable rates or compensation lawfully fixed by defendant, in the sense that such ownership or possession of a franchise implies any exclusive right, or right other than that possessed by each and every person, firm or corporation furnishing or desiring to furnish gas for the use of said defendant or its inhabitants for heat or lighting purposes. Defendant admits the allegations contained in paragraph 5 of plaintiff's complaint, lines 2 to 25 inclusive, of page 4. Defendant denies, however, that all of the plaintiff's plants, systems and other property in said paragraph mentioned, are now or ever have been actually used by the plaintiff in conducting and transacting its aforesaid business of manufacturing and furnishing gas to the defendant and its inhabitants; denies that it was at the date of filing said complaint, or at any time since, necessary for the plaintiff to use all of the property described in said paragraph 5 in conducting its aforesaid business, in order to adequately and sufficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat. In this behalf defendant alleges that plaintiff owns and possesses large quantities of machinery and other apparatus, a very large quantity of street mains, a large amount of real estate, and a number of buildings which were not during the fiscal year 1913-14, as alleged, used or useful or necessary in supplying the City and County of San Francisco or its inhabitants with gas for purposes of light and heat.

III.

Answering paragraph 6 of said complaint, defendant admits that the franchises described in paragraph 5 thereof, are not exclusive; admits that the defendant or any other natural person or corporation may establish and operate in competition with the plaintiff, works for supplying defendant and its inhabitants with gas for pur-

poses of light and heat, and alleges that the right so to do, during the fiscal year 1913-14, was a right conferred by general law and not by a special grant of the defendant.

IV.

Defendant admits the allegations in paragraphs 7, 8 and 9 of plaintiff's complaint.

V.

Defendant has no information or belief which enables it to answer the first allegation of paragraph 10 of plaintiff's complaint, and, basing its denial on lack of such information or belief, defendant denies that plaintiff has caused a careful inventory and appraisal, or any inventory or appraisal of all or any of its properties in the City and County of San Francisco to be made by competent engineers and others possessed of expert knowledge concerning the matters submitted to them, or that plaintiff has carefully considered said inventory and appraisal or the cost of additions and extensions made subsequent to the making of said inventory, if it has been made. Defendant denies that the value, as of date of plaintiff's complaint, of the franchises, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in connection with plaintiff's established business or otherwise or at all, is the sum of \$19,34 386,867.05, as alleged in said complaint, or any sum whatever in excess of the sum of \$9,161,840.75; denies that the average value thereof during the year beginning July 1, 1913, and ending June 30, 1914, was the sum of \$19,937,267.05, or any sum whatever in excess of \$9,339,337.89.

VI.

Answering paragraph 11 of plaintiff's complaint, defendant denies that the present reproduction value of that portion of the property therein described as subject to depreciation and diminution in value resulting from obsolescence or inadequacy, is or was on the 30th of June 1913, if measured by the cost of replacing or reproducing said gas manufacturing plants and distributing systems with new plants of the same kind, capacity and efficiency, or if measured in any proper manner whatever, equal to the sum of \$13,402,270.83, or any sum whatever in excess of \$11,587,348.83; denies that during the year beginning July 1, 1913, it was necessary for plaintiff to make, or that plaintiff did make, additions, extensions or improvements of said plants and systems for the purpose of meeting the demands of the defendant and its inhabitants with gas to the extent of \$1,100,800.00, or any sum whatever in excess of \$294,082.93; denies that, as the result of any additions, extensions or improvements actually made by plaintiff during the fiscal year 1913-14, the average reproduction value new of the property constituting plaintiff's plants and systems during said fiscal year was the sum of

\$13,952,670.83, or any sum whatever in excess of \$11,764,844.97; or that the average actual depreciated value thereof was in excess of the sum of \$8,250,000.

VII.

Defendant admits that the duly constituted committee of
35 defendant's Board of Supervisors, held divers hearings during the months of February, March, April, May and June, 1913, for the purpose of determining fair and reasonable rates to be charged by plaintiff to the City and County of San Francisco and its inhabitants during the fiscal year 1913-14, for furnishing gas for heating and lighting purposes; admits that at certain of said hearings plaintiff introduced statements verified by oath of its proper officers and oral evidence purporting to set forth the value of its aforesaid property and the necessity of its use; but denies that said statements or oral evidence correctly stated such value or necessity; denies that said statements or oral evidence correctly set forth the cost of manufacturing and distributing gas to the defendant or its inhabitants during the year beginning July 1, 1913, or the amount of gas which was demanded or purchased by the defendant or its inhabitants during said year, or any other facts which would enable said Board to ascertain and determine accurately what would be or constitute a reasonable return or compensation to be paid to plaintiff by the defendant and its inhabitants for gas furnished to them by the plaintiff during said fiscal year. Defendant admits that thereafter, the City and County of San Francisco, acting by its Board of Supervisors, did enact an ordinance on the 23rd day of June 1913, which was approved by the defendant's Mayor on the 26th day of June 1913, and became effective on the 1st day of July 1913, fixing and establishing the quality and illuminating power of gas to be furnished to the defendant and its inhabitants, and fixing the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate and price to be charged for such gas during the year commencing July 1, 1913, and ending June 30, 1914; admits that "Exhibit
D," attached to said complaint is a true and correct copy of
36 the last mentioned ordinance. Defendant admits that plaintiff protested against the adoption of said ordinance on various grounds; but denies that such protest was based upon any facts justifying same, and alleges that said protest was based wholly upon the desire of plaintiff to have the Board of Supervisors fix rates which they properly and reasonably considered to be unjustly high, and which would be an unfair and unjust and excessive burden upon the defendant and its inhabitants if permitted to be charged.

VIII.

Defendant denies that the rate of seventy-five (75) cents per thousand cubic feet fixed by said ordinance was not during the year beginning July 1, 1913, or at any time subsequent thereto, a fair and just compensation for gas of the quality and illuminating power prescribed by said ordinance or furnished by plaintiff; denies that

said rate was not at all or any times during said fiscal year sufficient to afford plaintiff reasonable and just compensation for the use of plaintiff's aforesaid property, in addition to the actual cost of manufacturing, distributing and selling such gas to the defendant or its inhabitants. In this behalf defendant alleges that said rate is and was at all times during said fiscal year 1913-14, wholly just, reasonable and sufficient to afford the plaintiff reasonable and adequate compensation for the use of its aforesaid property and the cost of manufacturing, distributing and selling such gas as aforesaid. Further answering allegations contained in paragraph 13 of said complaint, defendant admits that the gross revenue received by plaintiff from the conduct of its business during the year beginning July 1, 1913, and ending June 30, 1914, if computed on the basis of the seventy-five (75) cent rate fixed by said ordinance, did not exceed the sum of \$3,447,045.36, but alleges that said revenue

37 actually received, if computed on the basis of said rate, was the sum of \$3,414,182.96. Defendant denies that the total amount of expense actually and properly incurred by plaintiff in conducting its said business and in operating its said gas manufacturing plants during said fiscal year, exclusive of the cost of replacements or sums which should have been set aside as reserve funds to cover actual depreciation and probable losses from fire, casualties, obsolescence, inadequacy or contingencies, or all of said sums, was the sum of \$2,295,506.32, or any sum whatever in excess of \$1,995,575.76. Defendant denies that a reasonable amount for the plaintiff to have set aside from its revenue during the year beginning July 1, 1913, and ending June 30, 1914, to cover depreciation and probable losses in the conduct of its business, and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence or contingencies during said fiscal year was the sum of \$675,321.82, or any sum whatever in excess of \$495,000. Defendant denies that the net income which the plaintiff derived from the use of all its aforesaid property and from the conduct of its aforesaid business of manufacturing, distributing and selling gas to the defendant and its inhabitants for said fiscal year beginning July 1, 1913, did not exceed the sum of \$476,217.22, but alleges that said net income exceeded the sum of \$923,607.20; denies that said income did not exceed two and thirty-nine hundredths (2.39) per cent of the value of plaintiff's aforesaid property actually and necessarily used by plaintiff in manufacturing, distributing and selling gas to the defendant and its inhabitants during said fiscal year 1913-14, but alleges that said net income actually exceeded 9.8 per cent.

IX.

38 Answering paragraph 14 of said complaint, defendant denies that the several or any of the items making up the aggregate amounts of the plaintiff's estimated revenue, expenses or reserves for the year beginning July 1, 1913 and ending June 30, 1914, as shown in "Exhibit A" attached to said complaint, are correct, but alleges that the actual experience of plaintiff in

operating during said fiscal year demonstrates that said estimates were incorrect and erroneous. Defendant denies that the assumptions set forth in paragraph 14 of plaintiff's complaint are correctly made or that, with the exception of the first assumption, that said assumptions are reasonable or proper assumptions to be made, or that they were conservative or supported by facts which should be reasonably and properly considered in making the same. Defendant further alleges that said assumptions have been rendered wholly irrelevant and immaterial by the fact that said fiscal year 1913-14 has expired, and that it is now possible for plaintiff to inform the court as to the actual income received during said fiscal year under said ordinance rates and the actual and reasonable cost incurred in manufacturing and distributing gas during said fiscal year to the defendant and its inhabitants, and the necessary and proper reserves to be set aside and charged during said fiscal year for depreciation, obsolescence, fire insurance, casualty insurance and any other contingencies.

X.

Answering paragraph 15 of said complaint, defendant denies that the gross revenue received, expenses incurred and reserves set aside during the calendar year beginning January 1, 1912, and ending December 31, 1912, were the sums set forth in "Exhibit B" or any part thereof. In this behalf defendant alleges that the expense items set forth in "Exhibit B" contained many charges which were not and should not have been properly added to the cost of supplying gas to the defendant and its inhabitants; that many other items contained in said list are grossly excessive charges and should not be considered in determining the adequacy of the rates for the fiscal year beginning July 1, 1913, and ending June 30, 1914; that many of the items set aside as reserves are grossly excessive and improper items to be set aside for such purposes. Defendant further alleges that the matters set forth in said statement, "Exhibit B," have been rendered wholly irrelevant and immaterial by the fact that the fiscal year 1913-14 has now expired and the actual results of plaintiff's operations under the ordinance rates for said year can now be ascertained without reference to its experience during previous years.

XI.

Answering paragraph 16 of said complaint, defendant denies that the table marked "Exhibit C" attached thereto is a correct statement of the several classes of or the value of plaintiff's property or capital which was actually used by it in conducting its aforesaid business of manufacturing and furnishing gas to the defendant and its inhabitants during the fiscal year beginning July 1, 1913. In this behalf defendant alleges that said "Exhibit C" contains many capital items which did not represent property used or useful or necessary in supplying gas to the City and County of San Francisco or its inhabitants during the said fiscal year 1913-14; that many of the items

in said exhibit are grossly over-valued, and that the total value of said items does not and should not exceed the sum of \$9,339,337.89, as hereinbefore alleged.

XII.

Answering paragraph 17 of plaintiff's complaint, defendant denies that the sum of \$33,195.56, as therein alleged, does
40 not exceed the cost to the plaintiff during said fiscal year to insure at the rate then prevailing in San Francisco in responsible fire insurance companies against loss and damage by fire, such of its property as was subject to destruction or damage by fire, but alleges that said sum is very greatly in excess of the actual requirements of plaintiff during said fiscal year for an insurance reserve, and that the sum of \$10,000 is and was wholly reasonable and adequate for the purpose of such insurance during said fiscal year.

XIII.

Defendant denies that the item of \$61,695.15, as alleged in paragraph 18 of said complaint, did not very greatly exceed what it would cost or did cost plaintiff during said fiscal year 1913-14 to insure at the rates then prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries, but alleges that said sum is very greatly in excess of plaintiff's requirements for such purposes, and that the sum of \$15,000 is and was wholly adequate, reasonable and proper as a reserve for such casualty insurance during the said fiscal year.

XIV.

Answering paragraph 19 of said complaint, defendant denies that the average annual rate of depreciation of said plants and systems resulting from use, wear and the action of the elements, is 2.66 per cent of the reproduction value of said entire gas manufacturing plants and distributing systems, or that the item of \$371,141.05, shown in "Exhibit A" attached to said complaint as a reserve for depreciation is, as a matter of fact, 2.66 per cent of the fair average reproduction value of the property which constituted said gas manufacturing plants and distributing systems during the year
41 beginning July 1, 1913, or that said sum is a reasonable or conservative or proper amount for the plaintiff to reserve annually from its revenue as a fund for the replacement from time to time of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements. Defendant further denies that the sum of \$209,290.06 alleged in paragraph 20 of said complaint and in "Exhibit A" attached thereto is a reasonable or proper amount to set aside as a fund to cover probable losses resulting from obsolescence of parts of its said plants, inadequacy or contingencies, or to cover probable losses resulting from inevitable accident, extraordinary action of the elements, such as violent storms

of wind and rain and earthquake, and losses caused by acts of violence, riots and war, or that the sum amounts to only 1.5 per cent of the average reproduction value of the property constituting said gas manufacturing plants and distributing systems during the year beginning July 1, 1913; denies that it is reasonable or proper or necessary for plaintiff to carry any reserve whatever to cover possible losses from accident, extraordinary action of the elements, such as violent storms of wind and rain and earthquake, and losses caused by acts of violence, riots and war, but alleges that all of said contingencies are purely speculative and hypothetical, and, if they constitute any element at risk at all, are elements which are incidental to the operation of any business, and a part of the hazard covered by the rate of return received therefrom; that, moreover, said items are incapable of reasonably accurate estimation or computation and are of such unusual and infrequent occurrence as to be negligible factors in determining the fairness or sufficiency of the ordinance rates in question. Further answering paragraphs 19 and 20

42 of said complaint, defendant alleges that the percentage of 4 per cent., equivalent to the sum of \$470,000 for the fiscal year 1913-14 is a wholly sufficient, adequate and proper percentage, and a wholly sufficient, adequate and proper amount to be set aside from plaintiff's earnings for said fiscal year as a reserve to cover depreciation, obsolescence, inadequacy and contingencies capable of estimation accruing to, or resulting from, the operation of plaintiff's said gas plant and properties during said fiscal year, said allowance being computed on a straight line basis.

XV.

Answering paragraph 21 of said complaint, defendant denies that from time to time said plants or systems have been or will hereafter be damaged or parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence; denies that only a portion of said loss and damage can be remedied by ordinary current repairs or replacements from time to time out of plaintiff's current revenues, or that the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless, inefficient, or have been destroyed. Defendant denies that in order that the plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to the defendant and its inhabitants, that the plaintiff should set aside annually out of its revenue a sufficient sum to provide not only for current repairs, but also for such hypothetical replacements. Defendant denies that plaintiff has kept all the parts of its aforesaid plants and systems in good condition or repair, but alleges in particular that plaintiff's gas distributing system has been and was at all times during said
 43 fiscal year 1913-14 in such poor state of repair that a very large percentage of gas leakage resulted, with consequent waste and expense to the plaintiff and plaintiff's gas consumers. Defendant admits that plaintiff's plants and systems were during said fiscal year adequate for supplying the demand of defendant and

its inhabitants with gas; but alleges that many items of said system were not efficient items, that they were needless duplications, and wastefully operated as the result of buying out the plaintiff's competitors of the previous years. Defendant therefore denies that said plants and systems have been constructed or maintained prudently or economically. Defendant denies that plaintiff has a right, as alleged, to charge and collect for all gas furnished or sold by it to defendant and its inhabitants such compensation as will enable plaintiff not only to pay the expenses annually incurred by it in manufacturing and distributing gas, but also to set aside from its revenue and maintain reserve funds sufficient to provide for losses occasioned by wear and ordinary action of the elements, and contingencies or probable losses occasioned by fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war, and in addition thereto a reasonable annual return or profit upon the capital invested by the plaintiff in said plants, systems and business. In this behalf defendant denies that it is plaintiff's right to collect any rates whatever in excess of those determined by lawful authority to be reasonable, adequate and sufficient to compensate plaintiff for its actual proper cost of manufacturing and distributing gas, including ordinary depreciation and insurance reserves and a reasonable annual return upon capital used and useful and necessary in furnishing gas for heating and lighting purposes to defendant and its inhabitants. Defendant further denies

44 that refusal to allow plaintiff to set up reserves for the purely speculative and hypothetical contingencies alleged in paragraph 21 of said complaint amounts to the taking of the use of plaintiff's entire invested capital without paying due compensation therefor.

Defendant admits the propriety of allowing plaintiff a reasonable and adequate reserve for casualty insurance, and alleges that the sum of \$15,000.00 as aforesaid, is wholly adequate, reasonable and sufficient for such purpose. Answering paragraph 24 of said complaint, defendant denies that ever since plaintiff acquired aforesaid gas manufacturing plants and distributing systems that plaintiff has conducted, or is now conducting, its business of manufacturing, distributing and selling gas to the defendant and its inhabitants economically or prudently, or has maintained or is now maintaining its said plants and systems prudently or economically. In this behalf defendant alleges that many of plaintiff's expenses of operation, and in particular its general administration expenses, have been and were during the fiscal year 1913-14 grossly in excess of the amounts which should have been charged under prudent and economical management; that its reserves have been grossly over estimated and are very grossly in excess of plaintiff's experienced requirements during said fiscal years previous and subsequent thereto, and that as the result of such grossly excessive operating expenses and reserves any assumptions which are based thereon are and were excessive and unreliable.

XVII.

Defendant denies that during the year 1912-13, or during the year 1913-14, it was necessary for plaintiff to pay a rate of interest of as much as 6.1 per cent per year for money borrowed on security of its aforesaid property, but alleges that money could be secured during both of said fiscal years upon much more favorable terms
45 by corporations having monopoly and security of investment which characterized the investment of plaintiff in its San Francisco gas business during said years. Defendant denies that it was necessary for plaintiff or any other corporation, as hypothetically suggested, to earn a net profit of at least one and one-half times the entire amount of interest payable upon amounts of money borrowed upon such security; denies that during said fiscal year 1913-14 that the prevailing rate of interest in said City and County of San Francisco for money loaned upon good real estate security at an amount not exceeding 60 per cent of the value thereof, was, or has at any time since, been not less than 6 per cent net, the borrower paying all taxes and other charges. In this behalf defendant alleges that very large sums of money were borrowed upon good real estate security during said fiscal year, and since then at rates of interest not greater than 5 per cent in the City and County of San Francisco.

XVIII.

Answering paragraph 26 of said complaint, defendant denies that a net profit of 10 per cent per year upon the value of plaintiff's aforesaid property after paying all actual expenses of manufacturing, distributing and selling gas, and after making reasonable provision for depreciation and contingent and probable losses resulting from fire, casualties, obsolescence, inevitable accident, acts of violence, riots and war, is the minimum profit that will be reasonable compensation for the use of plaintiff's aforesaid property for the service rendered by plaintiff in conducting its said business under the then existing conditions. In this behalf defendant alleges that the minimum profit of 5 per cent after making reasonable provision and allowance for
46 operating expenses, depreciation and insurance reserves is reasonable and non-confiscatory compensation for the use of plaintiff's aforesaid property and for the service rendered by the plaintiff in conducting its said business under the conditions existing during the fiscal year 1913-14 aforesaid. Defendant denies that under said existing conditions that an ordinance or governmental act fixing rates to be charged by plaintiff for gas to be manufactured, distributed and sold by it to defendant and its inhabitants which did not permit the plaintiff to earn by the use of its aforesaid plants and systems and property and from the conduct of its business a net profit of at least 10 per cent per year upon the value of such plants, systems and property, over and above operation expense and reserve above indicated, or yield any percentage or profit greater than 5 per cent upon such value, after making such deductions and allowance will

matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said Defendant.

JAMES ROLPH, JR.

Subscribed and sworn to before me this 13th day of December 1916.

A. J. NAGLE, [SEAL.]

*Notary Public of the State of California, in and
for the City and County of San Francisco.*

Service by copy of within original is hereby admitted this 14th day of December, 1916.

WM. B. BOSLEY,
Solicitor for Plaintiff.

Endorsed Filed Dec. 15, 1916, W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

51 At a stated term to-wit, the March term, A. D. 1921, of the Southern Division of the United States District Court for the Northern District of California, Second Division, held at the court room, in the City and County of San Francisco, on Monday, the 6th day of June, in the year of our Lord one thousand nine hundred and twenty-one.

Present: The Honorable William C. Van Fleet, District Judge.

No. 27.

PACIFIC GAS & ELECTRIC CO.

vs.

CITY & COUNTY OF SAN FRANCISCO et al.

(Order Overruling Exceptions to Master's Report, etc.)

The exceptions of plaintiff and the exceptions of defendants, to the Master's report, heretofore submitted, being now fully considered and the opinion of Judge Rudkin being filed, it is ordered, in accordance with said opinion, that the exceptions to the report be overruled and that the report stand confirmed and that a decree be entered in accordance with said report.

52 In the Southern Division of the United States District Court
for the Northern District of California, Second Division.

In Equity. No 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, Defendant.

Decree.

This cause having been referred on the 15th day of December, 1916, to the Honorable H. M. Wright, Standing Master in Chancery of the above entitled Court, for hearing, and the said Master having filed herein on the 2d day of March, 1920, his report thereon, and each of the parties herein having duly filed exceptions to said report, and said exceptions thereto coming on regularly for hearing in this Court on the 1st day of June, 1920, and the matter having been duly presented and argued by the parties and submitted to the Court on briefs for its consideration and decision, and the Court having duly considered the same and having on the 6th day of June, 1921, rendered its opinion and decision overruling plaintiff's exceptions to said report and confirming said report as filed, and the Court having ordered that a decree should be entered in accordance with the conclusions set forth in said opinion,

Now, therefore, in accordance with such order,

53 It is hereby ordered, adjudged and decreed that the said
report of said Master H. M. Wright, filed herein on the 2d
day of March, 1920, be and it is hereby confirmed, and that
all exceptions of the complainant to said report are hereby over-
ruled. The court finds it unnecessary to pass upon the exceptions
of defendant.

It is hereby further ordered, adjudged and decreed that the ordinance of the Board of Supervisors of the City and County of San Francisco, passed on the 23d day of June, 1913, numbered Ordinance 2348, New Series, and set forth as Exhibit "D" to the complaint herein, and purporting to fix maximum rates to be charged for gas furnished to the City and County of San Francisco and its inhabitants during the fiscal year beginning July 1, 1913, and ending June 30, 1914, and the rates fixed by said ordinance afforded just and due compensation to complainant, are not a violation of the Fourteenth Amendment to the Constitution of the United States, and are reasonable and valid.

It is further ordered, adjudged and decreed that the preliminary restraining order heretofore granted in this case and all orders modifying the same be and they are hereby dissolved; that the plaintiff is hereby ordered and directed, within nine (9) calendar months from and after the date of entry of this decree, to return to each of its consumers from whom it has collected any sum or

sums of money in excess of the amounts which were properly chargeable at the rates fixed in said Ordinance No. 2348, New Series, for gas supplied to consumers while said ordinance was in effect, all of the excess sums so collected, together with interest thereon, to be computed as follows, viz.: interest at seven (7) per cent. per annum on such excess sums from the respective dates of their collection to the date of entry of this decree, and also interest at seven

54 (7) per cent. per annum on the total amount of said excess sums plus the interest so computed thereon, from the date of entry of this decree until the date at which said sums shall have been paid over to such consumers or to the Special Master of the Court for distribution as hereinafter provided, pursuant to the provisions of this decree; provided, that in order to minimize the labor and expense of computing the interest payable hereunder, methods of computation may be adopted involving the use of approximate averages of principal sums and of periods of time for which interest is payable which, in the opinion of the Special Master, will give substantially accurate results; provided, moreover, that the complainant may, and it is hereby authorized to deduct from the amount which is otherwise to be payable to any consumers under the terms of this decree, such sum or sums of money as may be due from such consumers to the complainant; provided, further, that prior to paying such amounts plaintiff may deduct therefrom such expenses as the Court has heretofore specified or may hereafter specify by order as a proper charge against said excess collections; and that the plaintiff at or before the expiration of said period of nine (9) months shall make a return to the Special Master hereinafter appointed by this Court, showing its compliance with this decree, together with the necessary books and vouchers supporting the same, and plaintiff shall pay to said Special Master at the time of making said return all of the unpaid balance which may be due to consumers under the provisions of this decree at the date of said return.

Said Special Master shall thereafter have sole and exclusive charge of locating the consumers entitled to such unpaid balance, or their legal representatives, and is hereby authorized and directed to pay to such consumers or their legal representatives when so located by him, the respective excess amounts due to them under the terms of this decree, out of the funds so deposited with him by plaintiff.

55 In order to facilitate the work of said Special Master, at the time of depositing said excess amounts for the account of said consumers who have not been paid, the plaintiff shall deliver to said Special Master books or statements showing the names and last known addresses of said consumers who have not been paid and the exact amount of principal and interest due to each of said consumers. If the Special Master shall be unable to locate any of the consumers to whom such payments are due or their legal representatives, he shall hold the amounts respectively due to such consumers subject to the further order of the Court.

It is further ordered, adjudged and decreed that for the purpose of assuring compliance with the provisions of this decree, Walter

B. Maling, Clerk of this Court, is hereby constituted and appointed as Special Master of this Court, with full authority and duty to supervise the execution of the provisions of this decree under the direction of the Court, and is thus selected as Special Master for the reason that the claims to the fund will be extremely numerous, and their identity and the amount of their claims will have to be established by incessant reference to the books of complainant and the records of the Court, and such books and records can be most expeditiously and economically consulted by a Special Master, who is an officer of this Court. The expenses of said Special Master shall be hereafter fixed by the Court and shall be a charge against the funds in his hands, to be apportioned as the Court may hereafter direct. The Court hereby expressly retains jurisdiction of the subject matter of this litigation for the purpose of regulating the execution of the terms and conditions of this decree.

It is further ordered, adjudged and decreed that the defendants have and recover of and from the plaintiff their costs expended and incurred in this suit, taxed at \$787.57.

56 Dated June 28, 1921.

FRANK H. RUDKIN,
District Judge.

Endorsed: Filed and entered July 6, 1921. Walter B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

57 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
Defendant.

Petition for Appeal to the Supreme Court of the United States.

To Honorable William C. Van Fleet, District Judge:

Pacific Gas and Electric Company, the plaintiff above named, conceiving itself to be aggrieved by the final decree made in the above entitled cause and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 1, does hereby appeal from said decree to the Supreme Court of the United States for the reasons specified in the assignment of errors which is filed herewith and prays that its appeal be allowed, that citation be issued as provided by law, and that

a transcript of the record, proceedings and papers upon which said decree was based be duly authenticated and sent to the Supreme Court of the United States sitting at Washington in the District of Columbia.

58 Said plaintiff, desiring that said decree be superseded and that the execution thereof be stayed pending the determination of its appeal therefrom, tenders its bond with sureties in such amount as may be required for that purpose, and prays that a proper order be made by you fixing the amount of such bond and directing that, upon the filing and approval of such bond, said decree be superseded and the execution thereof be stayed.

WM. B. BOSLEY,
Solicitor for Plaintiff.

59 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
Defendant.

Order Allowing Appeal and Fixing Amount of Bond.

On motion of William B. Boley, solicitor for plaintiff, it is hereby ordered as follows:

1. That the foregoing and annexed petition be granted and that plaintiff's appeal to the Supreme Court of the United States from the final decree mentioned in said petition be and the same is hereby allowed;

2. That a transcript of the record, proceedings, testimony, exhibits and papers upon which said decree was made be duly authenticated and transmitted to the Supreme Court of the United States;

3. That the amount of the bond on appeal to be filed by the plaintiff herein, the same to serve as a bond for costs and damages on appeal and also as a supersedeas bond, be fixed at the sum of five hundred thousand dollars (\$500,000.00), and that such bond
60 be executed by the plaintiff and good and sufficient sureties;
and

4. That, upon the filing and approval of such bond, said final decree shall be superseded and the execution thereof shall be stayed pending said appeal.

Done in open court this 13th day of September, 1921.

WM. C. VAN FLEET,

District Judge.

Endorsed: Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

61 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
Defendant.

Assignment of Errors and Prayer for Reversal.

Now comes the plaintiff, Pacific Gas and Electric Company, by William B. Bosley, its solicitor, and respectfully says:

(a) That there is manifest error in the record, to-wit, in the Master's report on final hearing, the order confirming said report and the final decree, in the above-entitled suit which was brought by said plaintiff for the purpose of obtaining a decree enjoining and restraining the defendant herein from enforcing a certain ordinance adopted by the Board of Supervisors of defendant City and County of San Francisco which purported to fix, as the maximum rate or price to be charged for gas furnished to said City and County of San Francisco and its inhabitants during the year beginning July 1, 1913 and ending June 30, 1914, the sum of seventy-five cents per thousand cubic feet;

(b) That the ground upon which said plaintiff sought to enjoin the enforcement of said ordinance in said suit was that said ordinance was void for repugnancy to the Fourteenth Amendment to the Constitution of the United States of America and particularly to those provisions of said amendment which declare that no state shall deprive any person of property without due process of law or deny to any person within its jurisdiction the equal protection of the laws; and

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(c) That to said plaintiff the rights secured by the aforesaid provisions of the Fourteenth Amendment and the justice which is its due have been denied by said final decree which confirms the Master's report, adjudges said maximum rate to be just and reasonable and said ordinance to be valid and not repugnant to said provisions

of said Fourteenth Amendment, and orders and directs said plaintiff to return, to each of its consumers from whom it collected any amount of money in excess of the amount authorized by said ordinance for gas supplied while said ordinance was in effect, the excess amount so collected together with interest thereon.

And now said plaintiff, appealing from said final decree to the Supreme Court of the United States, prays for the reversal of said decree, and assigns and sets out separately and particularly each error which it asserts and intends to urge as a ground for such reversal, as follows, viz:

1. Said District Court erred in adjudging, in and by said final decree, that the maximum rate for gas, to-wit, seventy-five cents per thousand cubic feet, fixed by said ordinance, afforded just and due compensation to plaintiff, and that said ordinance was reasonable and valid and did not deprive said plaintiff of its property without due process of law nor deny to said plaintiff the equal protection of the laws and was not repugnant to the aforesaid provisions of the Fourteenth Amendment to the Constitution of the United States.

2. Said District Court erred in ordering and adjudging, in and by said final decree, that the preliminary restraining orders theretofore granted in said suit be dissolved, and that plaintiff return, to each of its consumers from whom it had collected any money in excess of the amount authorized by said ordinance for gas supplied while said ordinance was in effect, to-wit, during the period commencing July 1, 1913 and ending June 30, 1914, the excess amount so collected together with legal interest thereon.

3. Said District Court erred in confirming in and by said final decree said Master's report, and in overruling in and by said final decree said plaintiff's exceptions to said report, and particularly in overruling the exceptions hereinafter specified.

4. Said District Court erred in overruling plaintiff's fourth exception to the Master's report. A true copy of said fourth exception, as it appears in the plaintiff's "Objections to Draft Report of Standing Master in Chancery on Final Hearing," which, having been overruled by the Master, became exceptions to the Master's final report, by virtue of a stipulation made pursuant to rule of court, is as follows:

"Objection No. 4. Plaintiff objects to the mixed finding of fact and conclusion of law, as shown on pages 27 to 31 of said draft report, that the sum of \$612,931.61, being a part of the estimated cost of cutting and relaying existing pavement included in the reproduction cost of plaintiff's gas distribution system in the City and County of San Francisco should be deducted and excluded from the reproduction cost of plaintiff's aforesaid structural property, because said sum of \$612,931.61 represents the estimated cost of cutting and relaying over gas mains and pipes certain

pavement which is not shown by the evidence to have been laid before the laying of the gas mains and pipes now covered thereby and which consequently is not shown to have entered into the actual historical cost of plaintiff's existing gas distribution system."

5. Said District Court erred in overruling plaintiff's sixth exception to the Master's report. A true copy of said sixth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 6. Plaintiff objects to the mixed finding of fact and conclusion of law implied in the statement in the second paragraph of page 75 of said draft report, viz: 'Accordingly, I shall determine the present value of plaintiff's plant and the reasonable annual allowance to reserve by the modified sinking fund method, including in the factors which have influenced the existing depreciation—the reserves which ought to be on hand—the effects of obsolescence and inadequacy as well as of physical deterioration.'

65 The finding so implied is, in effect, that it is just and equitable to determine the present value of plaintiff's aforesaid structural property and the reasonable annual allowances to be made to the plaintiff for accruing depreciation of such property caused by wear, physical deterioration, inadequacy and obsolescence all combined, by the application of the so-called Modified Sinking Fund Method as distinguished from the pure Sinking Fund Method."

The principal grounds of said sixth exception which are set forth in plaintiff's said objections are as follows:

"(b) This implied finding fails to make the natural and necessary distinction between (1) depreciation caused by gradual wear and gradual physical deterioration resulting from use and the known action of the elements, and (2) depreciation which results from causes fortuitous in their nature which include new inventions and discoveries resulting in obsolescence and changes in population and business resulting in inadequacy."

"(c) This implied finding, so far at least as it applies to the determination of the present value of plaintiff's structural property, is in conflict with the uncontradicted testimony of Mr. E. C. Jones with respect to the nature, use and present condition of by far the major part of plaintiff's aforesaid structural property."

6. Said District Court erred in overruling plaintiff's seventh exception to the Master's report. A true copy of said seventh exception, as it appears in plaintiff's said "Objections to Draft
66 Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 7. Plaintiff objects to each of the following findings of fact shown on page 79 of said draft report viz:

(1) The amount of the existing depreciation which ought to be deducted from the average reproduction cost in order to ascertain the present value of plaintiff's said structural property was, for the year 1913-14, the sum of \$1,518,390.00, for the year 1914-15, \$1,780,411.00, and for the year 1915-16, \$1,493,162.00; and

(2) The proper annual allowance for accruing depreciation of plaintiff's said structural property was for the year 1913-14 the sum of \$348,853.00, for the year 1914-15 the sum of \$372,680.00, and for the year 1915-16, the sum of \$380,519.00."

7. Said District Court erred in overruling plaintiff's eighth exception to the Master's report. A true copy of said eighth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 8. Plaintiff objects to the Master's failure to find the present value of plaintiff's patent rights which are described and discussed on pages 84 to 87 of said draft report and his failure to include such value in his subsequent finding as to the present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants during the period beginning July 1, 1913, and ending June 30, 1916."

67 8. Said District Court erred in overruling plaintiff's ninth exception to the Master's report. A true copy of said ninth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 9. Plaintiff objects to the Master's failure to find that plaintiff is legally and equitably entitled to the savings in the manufacture of gas effected by its use of the apparatus and process invented by E. C. Jones and Leon B. Jones and protected by the patents described on page 84 of said draft report, in addition to a reasonable return upon its property necessarily and properly used in supplying gas to said City and County of San Francisco and its inhabitants exclusive of said patent rights."

9. Said District Court erred in overruling plaintiff's tenth exception to the Master's report. A true copy of said tenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 10. Plaintiff objects to the Master's finding shown on page 86 of said draft report to the effect that the savings attributed by the plaintiff to the use of the aforesaid patented apparatus and process were due in part to economies incident to the production of larger quantities of gas."

10. Said District Court erred in overruling plaintiff's eleventh exception to the Master's report. A true copy of said eleventh exception, as it appears in plaintiff's said "Objectings to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

68 "Objection No. 11. Plaintiff objects to the Master's finding of fact set forth on page 95 of said draft report to the effect that, during the entire period from July 1, 1913, to June 30, 1916, the additional value of plaintiff's property used and useful in supplying gas to the City and County of San Francisco and its inhabitants when viewed as a going concern and in connection with the established business conducted by means thereof was the sum of \$1,500,000.00 and no more."

The principal grounds of said eleventh exception which are set forth in plaintiff's said objections are as follows:

"(a) Said finding with respect to 'going value' is not sustained by the evidence.

(b) The uncontradicted evidence introduced by plaintiff justifies and indeed compels the conclusion that the so-called 'going value' of plaintiff's aforesaid property was, during the entire period from July 1, 1913, to June 30, 1916, not less than the sum of \$3,000,000.00.

(c) The aforesaid finding with respect to 'going value' is essentially arbitrary because it is not supported by the evidence, but, on the contrary, clearly appears by the statement made on page 95 of said draft report to have been made in deference to what the Master conceived to be the meaning and effect of the opinion of Hon. Frank H. Rudkin rendered in passing upon the Master's report in the case of Spring Valley Water Company v. City and County of San Francisco, 252 Fed. 979, 985-6."

69 11. Said District Court erred in overruling plaintiff's twelfth exception to the Master's report. A true copy of said twelfth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 12. Plaintiff objects to the mixed finding of fact and conclusion of law shown in the last paragraph on page 98 of said draft report, 'that plaintiff's franchise has no separate or additional value beyond the sum of the values of its physical property, together with its going value already recognized in the foregoing appraisalment.'"

12. Said District Court erred in overruling plaintiff's thirteenth exception to the Master's report. A true copy of said thirteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 13. Plaintiff objects to the Master's finding of fact with respect to the total value of plaintiff's used and useful gas property in San Francisco and the findings with respect to the items designated as 'structures' and 'going value,' set forth on page 101 of said draft report; and also objects to his failure to include in the total value of said property the reasonable value of its aforesaid patent right and franchise."

13. Said District Court erred in overruling plaintiff's fourteenth exception to the Master's report. A true copy of said fourteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

70 "Objection No. 14. Plaintiff objects to the Master's mixed finding of fact and conclusion of law that plaintiff is not entitled to receive, in addition to the cost of operation and maintenance and a reasonable return upon the value of its property used and useful in supplying gas to its consumers in said City and County of San Francisco, a reasonable compensation for the service which it renders through the agency of its board of directors to its consumers by creating and maintaining an efficient organization of experienced men, by establishing a credit which enables it to obtain capital on favorable terms and by intelligently and efficiently directing and supervising such organization and the general conduct of its business whereby the service rendered to consumers is improved and economies are affected which normally result in the gradual reduction of cost of service to its consumers."

14. Said District Court erred in overruling plaintiff's fifteenth exception to the Master's report. A true copy of said fifteenth exception, as it appears in plaintiff's said "Objection to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 15. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of ten thousand dollars (\$10,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of fire insurance."

15. Said District Court erred in overruling plaintiff's sixteenth exception to the Master's report. A true copy of said sixteenth exception, as it appears in plaintiff's said "Objections to Draft
71 Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 16. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of fifteen thousand dollars (\$15,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of insurance against liability for personal injuries resulting from casualties."

16. Said District Court erred in overruling plaintiff's seventeenth exception to the Master's report. A true copy of said seventeenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 17. Plaintiff objects to the finding of fact that plaintiff is not entitled to any separate allowance in lieu of the cost of insuring its automobiles."

17. Said District Court erred in overruling plaintiff's nineteenth exception to the Master's report. A true copy of said nineteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 19. Plaintiff objects to the finding of fact set forth on page 111 of said draft report that the 'minimum fair rate of return that plaintiff was entitled to earn' was upon the present value of its property used and useful in furnishing gas to the City and County of San Francisco and its inhabitants 'was seven per cent a year.'"

18. Said District Court erred in overruling plaintiff twentieth exception to the Master's report. A true copy of said twentieth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 20. Plaintiff objects to the summaries and conclusions shown on pages 129 and 130 of said draft report to the extent that they embrace and involve the errors to which the foregoing objections Nos. 1 to 19 inclusive are directed upon the grounds hereinbefore set forth. With reference to the 'Ordinance Revenue' shown on page 130, plaintiff directs the Master's attention to the fact that plaintiff in its Exhibit No. 108 concedes that additions to its gross revenue as brought forward from Exhibit No. 38 should be made as follows, viz.:

(1) For the year 1913-14 the sum of \$8,650.45 making the corrected gross revenue the sum of \$3,414,182.96;

(2) For the year 1914-15 the sum of \$6,151.53 making the corrected gross revenue the sum of \$3,641,213.06; and

(3) For the year 1915-16 the sum of \$16,881.18 making the corrected gross revenue the sum of \$3,801,565.03."

19. Said District Court erred in overruling plaintiff's twenty-first exception to the Master's report. A true copy of said twenty-first exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing", is as follows:

"Objection No. 21. Plaintiff objects to the Master's conclusion of law expressed on pages 130 to 134 of said draft report that the fact that the natural and necessary effect of the aforesaid ordinances, if enforced, was to compel plaintiff to furnish gas to a large number of consumers, to-wit, approximately twenty thousand, in each of the three years from July 1, 1913, to June 30, 1916, at less than actual cost exclusive of any return on capital, the loss thence arising exceeding \$22,000.00 per year, is immaterial in the determination of the issue as to the reasonableness of the rates prescribed by, and the constitutionality of, said ordinances."

20. Said District Court erred in overruling plaintiff's twenty-third exception to the Master's report. A true copy of said twenty-third

exception, as it appears in plaintiff's said "objections to draft report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 23. Plaintiff objects to the Master's conclusion that the ordinances of the Board of Supervisors of the City and County of San Francisco fixing maximum rates for gas for the three years from July 1, 1913, to June 30, 1916, if they had been enforced, would have afforded plaintiff a fair return on the fair present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants."

21. Said District Court erred in overruling plaintiff's twenty-fourth exception to the Master's report. A true copy of said twenty-fourth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 24. Plaintiff objects to the Master's conclusion that the aforesaid ordinances provided a fair and just compensation for supplying gas to said City and County and its inhabitants and were valid under the Constitution of the United States."

74 22. Said District Court erred in overruling plaintiff's twenty-fifth exception to the Master's report. A true copy of said twenty-fifth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 25. Plaintiff objects to the Master's conclusion that the defendant in said suits should have decrees in its favor dismissing the bills of complaint therein with costs to the defendant and with proper provisions for return by plaintiff to the consumers of charges over the rates fixed by said ordinances."

The "Draft Report of Standing Master in Chancery on Final Hearing" was substantially the same as the Master's "Report on Final Hearing", the only changes therein being those noted in the Master's "Supplemental Report" which is attached to and forms a part of said Master's "Report on Final Hearing"; and the references made in the above and foregoing assignments of error and the exceptions mentioned therein to said draft report apply to said report on final hearing, the paging of both being the same.

The above-mentioned Master's Report covers three similar cases designated as cases Nos. 27, 97 and 190 in Equity in the above-entitled court, which were consolidated for trial and referred for hearing to the Standing Master in Chancery. Consequently the plaintiff's exceptions to the Master's Report cover all three cases.

Wherefore, said appellant Pacific Gas and Electric Company prays that the aforesaid final decree in the above-entitled suit be reversed by the Supreme Court of the United States and that such further relief be granted as may be meet and equitable.

WM. B. BOSLEY,
Solicitor for Plaintiff and Appellant.

- 75 Endorsed: Filed Sep. 13, 1921, W. B. Maling, Clerk, by
J. A. Schaertzer, Deputy Clerk.
- 76 In the Southern Division of the District Court of the United
States, in and for the Northern District of California,
Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
Defendant.*Bond on Appeal for all Damages and Costs to Operate as a
Supersedeas.*

Know all men by these presents that we, Pacific Gas and Electric Company, a corporation organized under the laws of the State of California and having its office and principal place of business in the City and County of San Francisco, state aforesaid, (being the plaintiff in the above entitled cause), as principal, and Henry E. Bothin, John D. McKee and A. F. Hockenbeamer, as sureties, are held and firmly bound unto City and County of San Francisco, a municipal corporation in the State of California, (being the defendant in the above entitled cause), for the use and benefit of said defendant and for the use and benefit of all other persons to whom any sum of money is payable under and pursuant to the provisions of the decree hereinafter mentioned, according to their respective rights and interests, in the sum of five hundred thousand dollars (\$500,000.00) to be paid to said defendant for its own use and benefit and for the use and benefit of said other persons, their respective successors, executors, administrators or assigns, and for the payment of said sum as aforesaid well and truly to be made said principal binds itself and its successors, and said sureties bind themselves and their respective heirs, executors and administrators, jointly and severally, firmly by these presents.

Whereas in the above entitled cause a final decree was made by the above entitled court and filed and entered in the office of the Clerk thereof on the 6th day of July, 1921; and

Whereas said principal has appealed, in the manner provided by law and the rules of court, from said final decree to the Supreme Court of the United States to reverse said decree:

Now, therefore, the condition of this obligation is such that, if said principal shall prosecute its said appeal to effect and, if it shall fail to make its plea good, shall answer all damages and costs, then

this obligation shall be void, but otherwise shall remain in full force and virtue.

Sealed with our seals and dated this 12th day of September, 1921.

(Corporate Seal.)

PACIFIC GAS AND ELECTRIC
COMPANY,

By JOHN A. BRITTON,
Its Vice-President and General Manager.

Attest:

D. H. FOOTE,

Its Secretary.

HENRY E. BOTHIN.

JOHN D. McKEE.

A. F. HOCKENBEAMER.

78 STATE OF CALIFORNIA,
City and County of San Francisco, ss:

On this 12th day of September, in the year 1921, before me, R. J. Cantrell, a notary public of the State of California, in and for said City and County of San Francisco, residing therein and duly commissioned and sworn, personally appeared John A. Britton, known to me to be the vice-president and general manager, and D. H. Foote, known to me to be the secretary, of Pacific Gas and Electric Company, the corporation which is named as principal in the above and foregoing instrument, and which executed the same, and acknowledged that said corporation executed said instrument.

In witness whereof I have hereunto set my hand and affixed my official seal in said City and County of San Francisco the day and year in this certificate first above written.

(Notarial Seal.)

R. J. CANTRELL,
*Notary Public of the State of California in and
for the City and County of San Francisco.*

79 UNITED STATES OF AMERICA,
*Northern Judicial District of California,
State of California,
City and County of San Francisco, ss:*

Henry E. Bothin, being first duly sworn, deposes and says: That he is a resident and a freeholder in the Southern Division of the Federal Northern Judicial District of California and worth the sum of five hundred thousand dollars (\$500,000.00), exclusive of property exempt from execution and over and above all debts and liabilities; and John D. McKee and A. F. Hockenbeamer, being first duly sworn, each for himself deposes and says: That he is a resident and a freeholder in the Southern Division of the Federal Northern Judicial District of California and worth the sum of two hundred and fifty thousand dollars (\$250,000.00), exclusive of property exempt from

execution and over and above all debts and liabilities; and they further severally acknowledge that they executed the annexed bond.

HENRY E. BOTHIN.

JOHN D. McKEE.

A. F. HOCKENBEAMER.

Subscribed and sworn to before me this 13 day of September, 1921.

[SEAL.]

J. A. SCHAERTZER,

*Deputy Clerk, U. S. District Court,
Northern District of California.*

Satisfactory to defendants.

R. M. SEARLS.

80 The within bond is approved.
Sept. 13, 1921.

WM. C. VAN FLEET,
U. S. Dist. Judge.

Endorsed: Filed Sep. 13, 1921, W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

81 In the District Court of the United States in and for the
Northern District of California, Second Division.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Bill of Complaint.

To the Honorable, the Judges of the District Court of the United States in and for the Northern District of California, Second Division:

Pacific Gas and Electric Company, plaintiff herein, brings this its bill of complaint against the City and County of San Francisco and James Rolph, Jr., defendants herein, and, for cause of action against the defendants herein, alleges as follows:

I.

82 Plaintiff, whose name is Pacific Gas and Electric Company, is now, and ever since the 10th day of October, 1905, has been, a corporation duly organized and existing under and by virtue of the laws of the State of California, and during all of said time has had and still has its office and principal place of business in

the City and County of San Francisco, State aforesaid, and, therefore, within the meaning of the Acts of Congress defining the jurisdiction of the Courts of the United States, is a citizen of the State of California.

II.

The defendant, City and County of San Francisco, is now and during all of the times herein mentioned has been a political subdivision of the State of California and a municipal corporation duly incorporated, organized and existing under and by virtue of the constitution and laws of the State of California and a charter duly and regularly adopted, approved and established pursuant to the provisions of the said constitution, and is situate in the Northern Judicial District of California and, therefore, within the meaning of the Acts of Congress defining the jurisdiction of the courts of the United States, is a citizen of the State of California.

III.

Defendant, James Rolph, Jr., is now and during all the times herein mentioned has been a resident of said City and County of San Francisco and a citizen of said State of California.

IV.

83 Defendant, City and County of San Francisco, under and by virtue of the constitution and laws of the State of California and the charter under which it is incorporated, is invested with the power to make and enforce, within its limits, through the agency of its own officers, all local, police, sanitary and other regulations which are not in conflict with general laws, and possesses, subject to the limitations contained in the constitution of the United States of America and the constitution of the State of California, the power to regulate the business of furnishing light, heat and power to itself and its inhabitants, and the power to fix and determine each year, by ordinance to take effect on the 1st day of July in such year, reasonable rates or compensation to be collected by any person or corporation for gas furnished to said City and County and its inhabitants for light and heat purposes, and the power to prescribe the quality of the service rendered by any and all persons engaged in furnishing gas for the purposes aforesaid, and the power to enforce, by its own executive officers and police courts, all ordinances enacted in the exercise of its aforesaid powers. The defendant, City and County of San Francisco, possesses the power to provide for lighting all of its public buildings and all of the public streets within its boundaries, and the power to compel the plaintiff to furnish all gas required for lighting such buildings and streets at such reasonable rates as it by its board of Supervisors shall from year to year establish.

Defendant, James Rolph, Jr., is now and ever since January, 1912, has been the Mayor of defendant, City and County of San Francisco, and as such is the chief executive officer of said City and required by its charter to see that all valid ordinances of said City and County are observed and enforced.

VI.

Defendant, City and County of San Francisco, does not own or control any public works for supplying itself or its inhabitants with artificial light, but has for many years provided for lighting with gas many of its public streets and public buildings by making contracts with the plaintiff and its predecessors in interest; and, under and pursuant to such contracts, plaintiff and its predecessors in interest have furnished all gas, labor, lamps and other materials and supplies required for lighting such public streets and buildings; and, under such a contract, the plaintiff is now lighting the defendant's public streets and public buildings and furnishing the gas, lamps, labor, materials and supplies required therefor.

VII.

Plaintiff is now and ever since the month of December, 1911, has been engaged in the business of manufacturing, distributing and selling gas to defendant, City and County of San Francisco, and to its inhabitants for light and heat purposes. The plaintiff is
 85 now and ever since the month of December, 1911, has been the owner in fee simple and in possession of the franchise granted by section 19 of article XI of the Constitution of California of using the public streets and highways in said City and County of San Francisco and of laying and maintainiung therein pipes and conduits and making connections therewith and of using such pipes and conduits for the purpose of conveying and distributing to said City and County and to its inhabitants gas for light and heat purposes, and of charging and collecting for all gas furnished to said City and County and its inhabitants reasonable rates or compensation subject only to the right of defendant, City and County of San Francisco, to regulate such rates or compensation as hereinbefore set forth. Plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain lands situate, in said City and County of San Francisco and certain lands in the County of San Mateo, State aforesaid, and of certain gas manufacturing plants erected thereon, consisting of machinery and apparatus used for manufacturing, generating, purifying and storing gas and the buildings wherein such machinery and apparatus are housed, and certain mains connecting said plants. The plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain gas distributing systems in said City and County of San Francisco, consisting of mains and pipes laid and maintained

86 in the public streets and highways in said City and County under the authority of the aforesaid franchise and machinery, apparatus and appliances used for forcing into and through said mains and pipes the gas manufactured at the aforesaid plants, and valves and other appliances used for the purpose of regulating and controlling the distribution and delivery of gas and meters used for measuring the amounts delivered to its consumers. The plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain other lands and divers warehouses constructed thereon which it uses for the purpose of storing, appliances, materials and supplies necessary for use in the conduct of its said business, a parcel of land and an office building erected thereon which it uses as a place wherein its officers and employees may transact its business, and a large amount of other property such as materials and supplies and working capital required for use in conducting its said business. All of plaintiff's plants, systems and other property hereinbefore mentioned are now actually being used by the plaintiff in conducting and transacting its aforesaid business of manufacturing and furnishing gas to the defendant and to its inhabitants; and it is now and will, during the entire year beginning July 1, 1914, and ending June 30, 1915, continue to be necessary for the plaintiff to use all of its aforesaid property in conducting its aforesaid business in order that it may adequately and efficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat.

87

VIII.

The aforesaid franchise owned by the plaintiff is not exclusive; but, under the constitution and laws of the State of California and the charter of defendant, City and County of San Francisco, said City and County, or any natural person or private corporation, having first obtained from said City and County a grant of the right so to do, may establish and operate in competition with the plaintiff works for supplying said City and County and its inhabitants with gas for purposes of light and heat.

IX.

Plaintiff's aforesaid gas manufacturing plants and gas distributing systems are of such a nature or character that they are subject to deterioration as the natural result of use, and the action of the elements, and are also subject to obsolescence as the result of new inventions and discoveries and the usual and normal progress and advancement in the arts and sciences relating to the generation and distribution of gas.

X.

The demand of defendant, City and County, and its inhabitants for gas for purposes of light and heat has greatly increased for many years, is now increasing and the plaintiff verily believes will continue

to increase. As the result of the greatly increasing demand of defendant, City and County, and its inhabitants for gas, the plaintiff and its predecessors in interest have from time to time in the
88 past found it necessary to replace portions of its gas manufacturing plants and gas distributing systems with larger apparatus, mains and appliances because the original apparatus, mains and other appliances had become inadequate for the increased service required by the increasing demand. The loss which the plaintiff and others in like situation must necessarily suffer by reason of the necessity arising periodically of substituting new and larger apparatus, mains and appliances for apparatus, mains and other appliances which, although not obsolete, deteriorated or worn out, have become inadequate as the result of the increased demand for gas is now generally by accountants and public service commissions called "loss from inadequacy" as distinguished from loss arising from depreciation or obsolescence; and the term "inadequacy" wherever used herein is employed to denote loss of this character. All of the plaintiff's gas manufacturing plants and distributing systems are subject to diminution in value as the result of inadequacy as well as from obsolescence and ordinary deterioration.

XI.

Some parts of the plaintiff's aforesaid gas manufacturing plants and gas distributing systems are subject to damage and destruction by fire.

XII.

The plaintiff has caused a careful inventory and appraisalment of all of its aforesaid properties in the City and County of San
89 Francisco and in the County of San Mateo to be made by competent engineers and others possessed of expert knowledge concerning the matters submitted to them, and has carefully considered said inventory and appraisalment and the cost of additions and extensions which have been made subsequent to the making of said inventory and appraisalment and is informed and verily believes and therefore says that the present value of the plaintiff's aforesaid franchise, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in connection with plaintiff's established business exceeds the sum of \$17,227,900.00, and that the average value thereof during the year beginning July 1, 1914, and ending June 30, 1915, will exceed the sum of \$17,544,200.00.

XIII.

Plaintiff, having carefully investigated and considered the inventory and appraisalment of its property above mentioned, is also informed and verily believes and therefore says that the present reproduction value of that portion of the aforesaid property which

is subject to deterioration and to diminution of value resulting from obsolescence and inadequacy consisting of the aforesaid gas manufacturing plants and distributing system, that is to say, the value thereof measured by the cost of replacing said gas manufacturing plants and distributing system with new plants of the same kind, capacity and efficiency, exceeds the sum of \$13,177,400.00; 90 that during the year beginning July 1, 1914, it will have to make and will make additions, extensions and improvements of said plants and systems for the purpose of meeting the demands of the defendant, City and County of San Francisco, and its inhabitants for gas, and that the cost of such additions, extensions and improvements will not be less than the sum of \$632,500.00, and that, as the result of the making of such additions, extensions, and improvements, the average reproduction value of the property constituting said plants and systems during the year beginning July 1, 1914, will exceed the sum of \$13,493,600.00.

XIV.

A committee of the Board of Supervisors of said City and County of San Francisco held divers hearings during the months of February, March, April, May and June, 1914, and at said hearings the plaintiff introduced statements verified by the oath of its proper officers and oral evidence to prove the value of its aforesaid property, the necessity of the use of said property for furnishing said City and County and its inhabitants with gas, the cost of manufacturing and distributing gas to said City and County and its inhabitants during the year beginning July 1, 1914, the amount of gas which would be demanded and purchased by said City and County and its inhabitants during said year and other pertinent facts to enable said

91 Board to ascertain and determine what will constitute a reasonable return or compensation to be paid by said City and County and its inhabitants for gas furnished to them by the plaintiff; and thereafter said City and County, acting by its Board of Supervisors, enacted an ordinance on the 29th day of June, 1914, which was approved by defendant Rolph as Mayor of said City and County on the 30th day of June, 1914, and went into effect on the 1st day of July, 1914, fixing and establishing the quality and illuminating power of gas to be furnished to said City and County and its inhabitants and the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate and price to be charged for such gas during the year commencing July 1, 1914, and ending June 30, 1915. A true copy of the last mentioned ordinance is hereunto annexed, marked "Exhibit A" and made a part hereof. At the final hearing before the said Board of Supervisors and before the adoption of said ordinance the plaintiff protested to said Board and to said Mayor that the rate of seventy-five (75) cents per thousand cubic feet would be insufficient to afford to the plaintiff just or reasonable compensation for the gas to be furnished to the City and County and its inhabitants during said year, and that an ordinance establishing such a rate would be confiscatory, unconstitutional and void.

XV.

The rate or compensation fixed by the aforesaid ordinance, viz., seventy-five (75) cents per thousand cubic feet of gas, is not now and will not at any time during the year beginning July 1, 1914, be just or reasonable compensation for gas of the quality and illuminating power prescribed by said ordinance, and is not now, and will not at any time during said year be, sufficient to afford to the plaintiff reasonable or just compensation for the use of plaintiff's aforesaid property in addition to the actual cost of manufacturing, distributing and selling such gas to said City and County and its inhabitants. The plaintiff, having by its officers and agents, carefully investigated the facts and estimated the amount of gas which will probably be purchased by said City and County and its inhabitants during the said year beginning July 1, 1914, and the cost of manufacturing, distributing and selling the same, including the expense to be incurred in maintaining its aforesaid plants, systems and property and the amounts of money which should be set aside from its revenues as reserve funds to cover losses resulting from fire, casualties, deterioration, obsolescence and inadequacy, is informed and verily believes and therefore says:

1. The entire revenue which it will receive from the conduct of its said business and the use of its said property during the year beginning July 1, 1914, and ending June 30, 1915, if it shall not be permitted to charge and collect from the defendant and its inhabitants more than seventy-five (75) cents per thousand cubic feet for the gas to be furnished by it, will not exceed the sum of \$3,499,849.90
2. The total amount of the expense which will actually be incurred by the plaintiff in conducting its said business and in operating its said gas manufacturing plants and distributing systems during the year beginning July 1, 1914, exclusive of the cost of replacements which will actually be made and the amounts of money which should be set aside from its revenue as reserve funds to cover actual deterioration and probable losses to result from fire, casualties, obsolescence and inadequacy, will not be less than the sum of \$2,280,231.53
3. A reasonable amount for the plaintiff to set aside from its revenues during the year beginning July 1, 1914, and ending June 30, 1915, to provide a fund to cover actual deterioration and probable losses in the conduct of its said business and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence and inadequacy, during said year beginning July 1, 1914, and ending June 30, 1915, will not be less than the sum of \$650,398.02

4. The net income which the plaintiff will derive from the use of all of its aforesaid property and from the conduct of its business of manufacturing, distributing and selling gas to said City and County and its inhabitants for said year beginning July 1, 1914, will not exceed the sum of . . . \$569,220.35
5. Said net income will not exceed three and 25/100 (3.25) per cent of the present value of the plaintiff's aforesaid property which will be actually and necessarily used by the plaintiff in manufacturing, distributing, and selling gas to the defendant and its inhabitants during said year beginning July 1, 1914.

XVI.

The several items which make up the aggregate amounts of the plaintiff's estimated revenues, expenses and reserves for the year beginning July 1, 1914, and ending June 30, 1915, set forth in the last preceding paragraph of this complaint, are shown in a statement of the estimated revenues and costs of the plaintiff's gas department in said City and County of San Francisco, which is annexed hereto, marked "Exhibit B" and made a part hereof. The estimates set forth in said statement are based upon the following assumptions, viz:

1. That the rate per thousand cubic feet of gas sold to the inhabitants of said City and County of San Francisco will be seventy-five (75) cents, and that the compensation to be received from said City and County for gas lighting service will be as fixed by contract now existing.

2. That the demand of said City and County and its inhabitants for gas will increase from the present time to the 30th day of June, 1915, at the same average rate as such demand has increased since July 1st, 1912, and that the total amount of gas to be sold and delivered by the plaintiff to said City and County and its inhabitants during the year beginning July 1, 1914, and ending June 30, 1915, will be 4,563,666,000 cubic feet;

3. That the plaintiff's expenses and reserves for maintaining its capital during the year beginning July 1, 1914, will increase only in proportion to the actual increase of the capital invested in those parts of its said plants and systems which are subject to destruction, deterioration, or diminution in value by fire, wear, action of the elements, obsolescence and inadequacy;

4. That plaintiff's other expenses will increase in proportion to the increase in the quantity of gas to be produced and sold by it to said City and County and its inhabitants during said year beginning July 1, 1914; and

96 5. That, during the year beginning July 1, 1914, wages of labor and prices of materials and supplies to be used by plaintiff in its said business will be the same as they were during the calendar year 1913.

Plaintiff is informed and verily believes and therefore says that the aforesaid assumptions are conservative and are supported by facts and by the experience of its officers who are now, and for many years have been, familiar with the business of manufacturing, distributing, and selling gas in said City and County of San Francisco, and that it is probable that wages and the prices of some of said materials and supplies will be higher during the year beginning July 1, 1914, than they were during the calendar year 1913.

XVII.

The plaintiff, in support of the estimates set forth in the last two preceding paragraphs of this complaint, and in said "Exhibit B," declares:

1. That it was permitted by the ordinance of said City and County of San Francisco then in force to charge and did charge the price of seventy-five (75) cents per thousand cubic feet, and no more, during the fiscal year beginning July 1, 1912, and ending June 30, 1913, for the gas sold by it to the inhabitants of said City and County; and that its gross revenue, expenses and reserves during said fiscal year are correctly shown in the statement which is hereunto annexed, marked "Exhibit C" and made a part hereof; and

97 2. That the ordinance of said City and County of San Francisco which was in force during the fiscal year beginning July 1, 1913, fixed seventy-five (75) cents per thousand cubic feet as the maximum price to be charged for gas; that seventy-five (75) cents per thousand cubic feet was the maximum price charged by plaintiff for gas from July 1st to August 31, 1913; that on or about the 18th day of July, 1913, this Court, in an action commenced by plaintiff herein against said City and County of San Francisco and numbered 27 on the Clerk's Register of Suits in Equity in this Court, made an order enjoining and restraining said defendant from enforcing the last mentioned ordinance; that on or about the 10th day of September, 1913, plaintiff adopted and put into effect in said City and County of San Francisco a schedule of rates, a true copy of which is as follows:

Eighty-five (85) cents per 1,000 cubic feet for each month in which the amount so delivered does not exceed 20,000 cubic feet;

Eighty-two and one-half (82½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 20,000 cubic feet, but does not exceed 30,000 cubic feet;

Eighty (80) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 30,000 cubic feet, but does not exceed 40,000 cubic feet;

Seventy-seven and one-half (77½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 40,000 cubic feet, but does not exceed 50,000 cubic feet;

Seventy-five (75) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 50,000 cubic feet.

98 that from the adoption of said schedule until June 30, 1914, the plaintiff herein has actually charged for the gas sold by it to the inhabitants of said City and County of San Francisco, in accordance with said schedule of rates, except in cases where a lower rate was agreed upon and established by written contract; that its actual gross revenue, expenses and reserves for the eleven months beginning July 1, 1913 and ending May 31, 1914, and its estimated gross revenue, expenses and reserves for the month of June, 1914, are correctly shown in the statement which is hereunto annexed, marked "Exhibit D" and made a part hereof; that said Exhibit D shows also what would have been the plaintiff's gross revenue, expenses and reserves had it charged for the gas sold by it to the inhabitants of said City and County of San Francisco subsequent to July 1, 1913, only the price of seventy-five (75) cents per one thousand cubic feet as authorized by the last mentioned ordinance.

XVIII.

The plaintiff's aforesaid properties used and useful at the present time in furnishing gas to said City and County of San Francisco and its inhabitants consists of the following:

a. Lands which are of the value of	\$907,413.00
b. Gas manufacturing plants and distributing system which are of the value of	\$11,514,524.00

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c. Working capital, including materials and supplies, accounts receivable and cash on hand and required for current use, the total value of which is approximately	\$450,000.00
d. The aforesaid franchise which exceeds in value the sum of	\$1,500,000.00
e. Going concern, established business and good will, which exceeds in value the sum of	\$2,856,000.00
Total	<u>\$17,227,937.00</u>

XIX.

Plaintiff is informed and believes and therefore says that the item of \$45,953.81 shown in said "Exhibit B" as a reserve for fire insurance for the year beginning July 1, 1914, does not exceed what it would cost plaintiff during said year to insure, at the rates now prevailing in San Francisco, in responsible fire insurance companies,

against loss and damage by fire so much of its aforesaid property as is subject to destruction or damage by fire. Plaintiff is not now insuring its property against loss or damage by fire, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover fire losses. Plaintiff is informed and believes and therefore says that the reserve for fire insurance shown in said "Exhibit B" is reasonable and is based upon conservative estimates of fire risks.

XX.

Plaintiff is informed and believes and therefore says that the item of \$16,118.94, shown in said "Exhibit B" as a reserve for
100 casualty insurance for the year beginning July 1, 1914, does not exceed what it would cost plaintiff during said year to insure at the rates now prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries. Plaintiff is not now carrying casualty insurance, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover liability to its employees and the public for personal injuries. Plaintiff is informed and believes and therefore says that the reserve for casualty insurance shown on said "Exhibit B" is reasonable and is based upon conservative estimates of casualty risks.

XXI.

Plaintiff has caused a careful investigation and estimate to be made by skilled valuation engineers for the purpose of ascertaining the average annual rate of depreciation of the component parts of its aforesaid gas manufacturing plants and distributing systems resulting naturally from use and wear and the action of the elements and has been informed by said engineers and verily believes and therefore says that the average annual rate of depreciation of said plants and systems resulting from use, wear and the action of the elements exceeds 2.86 per cent of the reproduction value of said entire gas manufacturing plants and distributing systems, and that the item
101 of \$385,919.79 shown in said "Exhibit B" as a reserve for depreciation is 2.86 per cent of the average reproduction value of the property which will constitute said gas manufacturing plants and distributing systems during the year beginning July 1, 1914, and is a reasonable and conservative amount for the plaintiff to reserve annually from its revenues as a fund for the replacement from time to time of parts of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements.

XXII.

Plaintiff is informed and verily believes and therefore says that the item of \$202,405.48, shown in said "Exhibit B" as a reserve for obsolescence and inadequacy is a reasonable and proper amount to

set aside as a fund to cover probable losses resulting from obsolescence of parts of its said plants and systems and inadequacy as hereinbefore defined, and amounts only to one and one-half per cent of the average reproduction value of the property which will constitute the said gas manufacturing plants and distributing systems during the year beginning July 1, 1914.

XXIII.

The component parts of plaintiff's aforesaid gas manufacturing plants and distributing systems are continually wearing out by use and diminishing in value by the ordinary action of the elements, and from time to time become obsolete and inadequate and have to be repaired and replaced. From time to time plaintiff's said plants and systems have been and will hereafter, in all probability, be damaged and parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence. A portion only of the loss and damage which the plaintiff sustains as a result of the causes mentioned in this paragraph can be remedied by ordinary current repairs and replacements which are made from time to time out of plaintiff's current revenues and the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless or inefficient or have been destroyed. For the reasons set forth in this paragraph it is necessary, in order that the plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to said City and County of San Francisco and its inhabitants, that the plaintiff shall set aside annually out of its revenue a sufficient fund to provide not only for current repairs and replacements, but also for periodical replacements. Plaintiff has from time to time in the past repaired and replaced and is now from time to time repairing and replacing the component parts of its aforesaid plants and systems and has kept and is keeping the same in good condition and repair. The plaintiff's aforesaid plants and systems are now adequate and efficient for supplying the present demand of said City and County and its inhabitants with gas and have been constructed and maintained prudently and economically. It is the duty of the plaintiff to maintain its said plants and systems in good order and condition so that the same shall at all times be adequate and efficient for serving said City and County and its inhabitants with gas and from time to time to replace parts thereof and to make extensions, additions and betterments to meet the increased demand of said City and County and its inhabitants. As against said City and County of San Francisco in the exercise of the latter's power to fix the compensation to be charged and collected by the plaintiff for gas furnished to said City and County and its inhabitants, plaintiff has the right to charge and collect for all gas furnished and sold by it to them such compensation as will enable the plaintiff, not only to pay the expenses actually incurred by it in manufacturing and distributing gas, but also to set aside from its revenue and to maintain reserve

funds sufficient to make reasonable provision for losses occasioned by wear and ordinary action of the elements and contingent or probable losses occasioned by fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war and a reasonable annual return or profit upon the capital invested by the plaintiff in said plants, systems and business. If the plaintiff shall be allowed to collect rates or compensation only sufficient to enable it to pay the cost of manufacturing and distributing gas to said City and County and its inhabitants, including in such cost operating expenses, current expenses for repairs and maintenance, taxes and a reasonable income or return upon its

capital invested in its aforesaid plants, systems and business, 104 and shall not be allowed to collect in addition thereto an amount sufficient to make adequate provision for periodical and contingent losses and damage resulting from the causes hereinbefore specified, then when said plants and systems shall have become worn out, obsolete or destroyed, the plaintiff will have received from said City and County and its inhabitants only reasonable income upon its capital invested, and its capital will have been consumed or destroyed in the service of said City and County and its inhabitants and said City and County and its inhabitants will have appropriated and taken for their own use plaintiff's entire invested capital and the use thereof, but will have paid for nothing except such use.

XXIV.

Plaintiff in conducting its business of manufacturing and distributing gas to said City and County and its inhabitants necessarily employs a large number of officers, engineers, mechanics, and other skilled men and also unskilled laborers for whose acts in the course of their employment it is responsible. Plaintiff in conducting its said business at all times exercises a high degree of care in the employment and supervision of all of the men employed by it and in the conduct of its business; but, nevertheless, in the conduct of its said business and in the operation of its gas manufacturing plants and distributing systems, casualties do occur from time to time which

result in injury to its employees, its consumers and to other 105 persons under circumstances which give rise to legal liability on the part of the plaintiff for the damage caused by such injury. For these reasons it is necessary for the plaintiff to set aside from its revenue and to charge as a part of the cost of manufacturing and distributing gas to said City and County and its inhabitants a reasonable and sufficient sum annually to enable it to discharge all liabilities arising from the causes mentioned in this paragraph of this complaint.

XXV.

Plaintiff in conducting its aforesaid business necessarily hazards its invested capital in the same way and to the same extent as any other person who invests capital in business. Neither said City and

County nor its inhabitants nor the State of California in any manner indemnifies or undertakes to indemnify the plaintiff against loss of capital or loss of income suffered in the conduct of the plaintiff's said business. If the plaintiff's business of manufacturing and distributing gas to said City and County and its inhabitants at rates established by plaintiff itself or by said City and County shall prove unprofitable and if the income derived from such business shall not be sufficient to compensate plaintiff fully for the entire cost of manufacturing and distributing such gas, the loss resulting will have to be borne by the plaintiff, and the plaintiff has not the right of recouping such loss by charging said City and County or its inhabitants at any time any more than reasonable rates.

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XXVI.

Plaintiff, ever since it acquired its aforesaid gas manufacturing plants and distributing systems, has conducted and is now conducting and will continue to conduct its business of manufacturing, distributing, and selling gas to said City and County and its inhabitants economically and prudently and is now maintaining and will continue to maintain its said plants and systems prudently and economically; and all of the estimates hereinbefore set forth of the revenues to be derived by the plaintiff from the conduct of its aforesaid business and the use and operation of its aforesaid plants and systems and of all of the costs of manufacturing, distributing and selling gas to said City and County and its inhabitants, and of making provision for the maintenance and preservation of its said plants and systems are based upon the assumption that the plaintiff will act prudently and economically in the conduct of its said business and in the maintenance and preservation of its said plants and systems.

XXVII.

At no time during the past year has it been possible for the plaintiff to borrow upon the security of its aforesaid property more than seventy-five (75) per cent of its present value, or at a lower rate of interest than seven (7) per cent per year, and at the present time plaintiff cannot borrow upon the security of its aforesaid property money required for extensions, additions or betterments at a lower rate of interest than seven (7) per cent per year. Money cannot

107 be borrowed at the present time in any large amount upon terms as favorable as those already mentioned in this paragraph of this complaint, except by corporations or persons who have an established business and good credit and who can show that they derive from the use of the property hypothecated as security and from the conduct of their business a net profit amounting to at least one and one-half times the entire amount of interest payable upon the money borrowed upon such security. Plaintiff further shows that the prevailing rate of interest in said City and County of San Francisco for money loaned upon good real estate security to an amount not exceeding sixty (60) per cent of the value thereof

has been for more than one (1) year, is now, and probably will continue to be for a long time to come, not less than six (6) per cent net, the borrower paying all taxes and other charges.

XXVIII.

Plaintiff is informed and believes and therefore says that a net profit of eight and one-half per cent per year upon the value of its aforesaid property, after paying all actual expenses of manufacturing, distributing and selling gas and after making reasonable provision for ordinary and inevitable depreciation and contingent and probable losses resulting from fire, casualties, obsolescence, inevitable accident, violence, riots and war, is the minimum profit that will be reasonable compensation for the use of the plaintiff's aforesaid property and for the service rendered by the plaintiff's aforesaid property and for the service rendered by the plaintiff in conducting its said business under existing conditions; and plaintiff further says that, under the existing conditions as shown herein, any law or ordinance or governmental act fixing rates to be charged by the plaintiff for gas to be manufactured, distributed and sold by it to said City and County and its inhabitants which will not permit the plaintiff to earn by the use of its aforesaid plants, systems and property and from the conduct of its business a net profit of at least eight and one-half per cent per year upon the value of such plants, systems and property, over and above the cost of operation and maintenance and a reasonable allowance for actual ordinary depreciation and reasonable allowances or reserves to cover contingent or probable losses due to obsolescence, inadequacy, fire, casualties, extraordinary action of the elements, inevitable accident, acts of violence, riots, and war, will operate to deny to the plaintiff the equal protection of the laws and to deprive the plaintiff of its property and the use thereof without just compensation and without due process of law in violation of the 14th amendment to the Constitution of the United States of America.

XXIX.

Illuminating and fuel gas of the quality prescribed by the aforesaid ordinance, a copy whereof is hereunto annexed, has at all times herein mentioned been and is now reasonably worth to the consumers thereof in said City and County of San Francisco not less than the prices set forth in the schedule of rates contained in paragraph XVII of this complaint, and the rates set forth in said schedule are the lowest rates that will afford to plaintiff just or reasonable compensation for the gas furnished by it in said City and County and too low to afford to the plaintiff reasonable compensation for the use of its aforesaid property. For these reasons also, the aforesaid ordinance, which was approved by the said Mayor June 30, 1914, and which fixes the maximum price to be charged for such gas at seventy-five (75) cents per thousand cubic

feet, denies to the plaintiff the equal protection of the laws, and, if enforced, will deprive plaintiff of its property without just compensation and without due process of law in violation of the 14th amendment to the Constitution of the United States of America.

XXX.

Plaintiff is informed, verily believes and therefore says that the defendants, unless restrained by order of this court from enforcing the aforesaid ordinance, will compel the plaintiff to furnish to the inhabitants of said City and County throughout the entire year beginning July 1, 1914, gas of the quality and illuminating power prescribed by said ordinance and at the price fixed thereby, namely, seventy-five (75) cents per thousand cubic feet; and that the State of California will adopt the acts of the defendants and will deprive plaintiff of its property and of the use of its property without just or reasonable compensation and without due process of law, and will deny to the plaintiff the equal protection of the laws in violation of the fourteenth amendment of the Constitution of the United States; and that the aforesaid ordinance is repugnant to and in violation of the fourteenth amendment to the Constitution of the United States of America and therefore null and void.

XXXI.

Defendants herein have threatened and are now threatening and each of them has threatened and is now threatening to enforce immediately and continuously the aforesaid ordinance and all the provisions thereof, and, by means of criminal proceedings in the police courts of said City and County and otherwise, to compel the plaintiff to furnish gas to the inhabitants of said City and County at the rate of seventy-five (75) cents per thousand cubic feet. The plaintiff is informed and believes and therefore says that, if the plaintiff shall refuse or fail to comply with the provisions of said ordinance, or to supply gas to the defendant's inhabitants at rates not exceeding the maximum prescribed by said ordinance, the defendants will, through the officers and agents of said City and County, unless restrained by order of this court, institute many hundreds of actions in said police courts against the plaintiff, its officers and agents to enforce the penalties prescribed by section 8 of said ordinance, and that, unless the defendants shall be restrained by this court, many of the inhabitants of said City and County will, in case of the plaintiff refusing to furnish them with gas at a rate not exceeding the rate prescribed by said ordinance, institute many suits and actions at law to compel the plaintiff to furnish them with gas at the rate prescribed by said ordinance, and to recover the penalties prescribed by section 629 of the Civil Code of California, viz., fifty dollars (\$50.00) and five dollars (\$5.00) per day for every day that the plaintiff shall continue to refuse to furnish any applicant with gas at the rate prescribed by said ordinance, and that the plaintiff will thereby be irreparably damaged and subjected to a multiplicity of suits and proceedings at law.

XXXII.

Plaintiff is advised by its solicitors and therefore says that there is no remedy except in equity for a complete determination of the invalidity of the aforesaid ordinance fixing gas rates for the fiscal year beginning July 1, 1914, and for the protection of the plaintiff from being deprived of its property without due process of law and from the denial of its right to the equal protection of the laws by the threatened enforcement of said ordinance; and the plaintiff further says that, in the absence of the remedy of injunction afforded by courts of equity, the said ordinance would be enforced by the defendants in violation of plaintiff's rights under the provisions of the fourteenth amendment of the Constitution of the United States of America, on which account the plaintiff invokes the jurisdiction of this court to protect it against the threatened enforcement of the said ordinance and the threatened deprivation of its property without due process of law, and the threatened denial of its rights to the equal protection of the laws in violation of the Constitution of the United States of America.

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XXXIII.

The matter in dispute in this action exceeds, exclusive of interest and costs, the sum or value of three thousand dollars (\$3,000.00).

XXXIV.

In support of its prayer for a restraining order pending the hearing upon an order to show cause why a temporary injunction should not be issued pending the final determination of this suit, the plaintiff shows that it has been and now is the practice of the plaintiff to furnish gas to said City and County and its inhabitants upon one month's credit in all cases where they request it so to do and give adequate security or establish their credit to the plaintiff's satisfaction; that more than 100,000 of the inhabitants of said City and County are now being furnished by the plaintiff with gas upon one month's credit at the rates set forth in the schedule contained in paragraph XVII of this complaint; that unless a temporary restraining order shall be issued out of this court upon the filing of this complaint, the plaintiff will be subjected to the penalties prescribed by the aforesaid ordinance, unless it shall accept payment at the rate of seventy-five (75) cents per thousand cubic feet for gas furnished subsequent to June 30, 1914, as prescribed by said ordinance, and the plaintiff will be unable to collect for such gas any greater compensation than the rate prescribed by said ordinance; and that plaintiff is now being deprived of its property without due process of law and being denied the equal protection of the laws and
 113 until the issuance of an injunction pendente lite herein, will be deprived of its property without due process of law, and be denied the equal protection of the laws continuously by the operation of the aforesaid ordinance and the defendants' threatened

enforcement thereof in violation of the fourteenth amendment of the Constitution of the United States of America, and is suffering and will continue to suffer, until the enforcement of said ordinance shall be enjoined by this court, immediate and irreparable loss and damage.

To the end therefore that the plaintiff may have that relief which it can only obtain in a court of equity, and that the defendants may answer the premises and all and singular the allegations herein contained (but not upon oath or affirmation, the benefit whereof is hereby expressly waived by the plaintiff) the plaintiff now prays:

1. That it be adjudged and decreed that the aforesaid ordinance is void and without force or effect, because in contravention of the fourteenth amendment to the Constitution of the United States of America, in that the said ordinance, if enforced, will operate to deprive plaintiff of its property without due process of law and to deny to plaintiff the equal protection of the law;

2. That it be adjudged and decreed that plaintiff has no adequate remedy at law for the injury and damage which would result to it from the threatened enforcement of said ordinance, and
114 that such injury and damage would be irreparable;

3. That it be adjudged and decreed that plaintiff be granted writs, both temporary and permanent, of injunction, issuing out of and under the seal of this Honorable Court, against the defendants, enjoining and restraining them and all persons acting by or under their authority as officers, agents, servants, employees or otherwise from in any way enforcing or attempting to enforce the said ordinance or any of the provisions thereof; and that, under and by virtue of the provisions of section 263 of the Judicial Code of the United States, a restraining order may be granted against the defendants, their officers, agents, servants and employees, restraining them as hereinbefore stated, until this Honorable Court shall determine, upon motion and hearing, whether a temporary injunction of like purport and tenor as hereinbefore prayed for shall not be granted pendente lite.

4. Plaintiff further prays that, if at any time hereafter and prior to the final hearing hereof, any person or persons shall attempt to enforce the provisions of said ordinance, or otherwise to act or proceed thereunder, such person, or persons, or some of them on behalf of all, be made parties defendant herein, and each of them be enjoined and restrained as hereinbefore prayed; and that plaintiff have such further or other or different relief as to the Court may seem meet and the nature of the case may require;

115 5. Plaintiff further prays that this Honorable Court grant unto the plaintiff a writ of subpoena ad respondendum issuing out of and under the seal of this Honorable Court to be directed to said defendants commanding each of them on a certain day and under a certain penalty to be therein inserted, to appear before your

Honors in this Honorable Court, and then and there full, direct, true and perfect answers make to all and singular the premises (but not upon oath or affirmation, the benefit thereof is hereby expressly waived by plaintiff); and further to stand, do, perform and abide by such order and decree as to your Honors may seem meet, and also that a writ of provisional injunction to the same purport, tenor and effect as hereinbefore set forth and appears be granted during the pendency of this action; and plaintiff will ever pray, etc.

PACIFIC GAS AND ELECTRIC COMPANY,
By JOHN A. BRITTON,
Its Vice-President and General Manager.

GARRET W. McENERNEY,
C. P. CUTTEN,
WM. B. BOSLEY,
Solicitors for Complainant.

116 UNITED STATES OF AMERICA,
Northern District of California,
City and County of San Francisco, ss:

John A. Britton, being first duly sworn, deposes and says: That he is one of the vice-presidents and the general manager of the Pacific Gas and Electric Company, a corporation, which is the plaintiff named in the above and foregoing bill of complaint, and which has subscribed to the same; and that the said bill of complaint and all and singular the allegations therein contained are true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said corporation.

JOHN A. BRITTON.

Subscribed and sworn to before me this 2 day of July, 1914.

[Notarial Seal.]

R. J. CANTRELL, :
Notary Public of the State of California,
in and for the City and County of San Francisco.

117 EXHIBIT A.

Bill No. 3087, Ordinance No. 2814 (New Series).

Fixing the Minimum Standard, Quality, and Illuminating Power of Gas and the Maximum Rate and Price to be Charged Therefor, for the Year Commencing July 1, 1914, and Ending June 30, 1915.

Be it Ordained by the People of the City and County of San Francisco as follows:

Section 1. The minimum standard quality and illuminating and heating power of gas to be furnished by any person, firm or corporation, to be used in the City and County of San Francisco, is hereby established at nineteen (19) candles, with a minimum heat value of 600 British thermal units.

The pressure shall not be less than two (2) inches nor more than nine (9) inches of water in height against the atmospheric pressure, said candle and heating power and pressure to be determined by the Board of Public Works of the City and County of San Francisco.

Section 2. The maximum rate and price to be charged and collected therefor from consumers by any such person, firm or corporation for the year commencing July 1, 1914, and ending June 30, 1915, is hereby fixed and established at seventy-five (75) cents per one thousand cubic feet.

118 Section 3. The maximum rate and price to be charged by any person, firm or corporation for furnishing gas for heating purposes for the year commencing July 1, 1914, and ending June 30, 1915, is hereby fixed at seventy-five (75) cents per one thousand cubic feet.

Section 4. The maximum rate and price to be charged by any person, firm or corporation for furnishing incandescent gas lamps for lighting the public streets, parks or squares for the year commencing July 1, 1914, and ending June 30, 1915, is hereby fixed at eight (8) cents per lamp per night, including care, lighting and extinguishing, each lamp to be kept burning from thirty (30) minutes after sunset until thirty (30) minutes before sunrise on the next day, and the number of such gas lamps may be increased or diminished by the Board of Supervisors, and subject to any moonlight schedule the Board may adopt, provided that the price of incandescent gas lamps of three lights each is hereby fixed at fifteen (15) cents a cluster lamp per night.

Section 5. The maximum rate and price to be charged by any person, firm or corporation for furnishing gas for lighting public buildings for the year commencing July 1, 1914, and ending June 30, 1915, is hereby fixed at seventy-five (75) cents per one thousand cubic feet.

Section 6. A charge of fifty (50) cents for the maintenance of a meter during any month may be made to any consumer whose bill for the gas furnished during such month does not exceed fifty (50) cents, but in the event of such charge being made, no further charge shall be made for current furnished during said month to said consumer.

119 Section 7. All ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

Section 8. Any person, firm or corporation, or any officer or agent of any person, firm or corporation, violating any of the provisions of this Ordinance shall be deemed guilty of a misdemeanor and upon

conviction thereof shall be punished by a fine not exceeding five hundred (\$500) dollars, or by imprisonment not exceeding six (6) months, or by both such fine and imprisonment, and such person, firm or corporation shall be guilty of a separate offense for every day that such violation shall continue, and shall be subject to the penalty imposed by this section for each and every separate offense.

Section 9. This Ordinance shall take effect and be in force on the first day of July, 1914.

Finally Passed—Board of Supervisors, San Francisco, June 29, 1914.

Ayes: Supervisors Deasy, Gallagher, Hayden, Hilmer, Jennings, Kortick, McCarthy, McLoran, Nelson, Nolan, Payot, Power, Suhr, Vogelsang, Walsh.

Absent: Supervisors Bancroft, Hocks, Murdock.

J. S. DUNNIGAN,

Clerk.

Approved, San Francisco, June 30, 1914.

JAMES ROLPH, JR.,

Mayor.

EXHIBIT "B."

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

Gas Department.

Year Beginning July 1st, 1914, and Ending June 30th, 1915.

(Estimate Based on Year July 1st, 1913, to June 30th, 1914.)

Gross Revenue:

Sales of Gas in San Francisco.....	\$3,310,901	32
Municipal Street Lighting Service.....	92,624	18
Rental of Gas Arcs.....	49,544	62
Sales of Gas to Other Departments.....	46,779	78
Total Gross Revenue.....	3,499,849	90

Expenses:

Maintenance of Generating Capital.....	46,330	10
Maintenance of Distribution Capital.....	163,420	05
Generating Expenses.....	1,019,330	19

Including revenue
in excess of
ordinance rates.

#	
\$3,735,133	53
92,624	18
49,544	62
46,779	78
3,924,082	11

46,330	10
163,420	05
1,019,330	19

Distribution Expenses.....	580,583 95	580,583 95
Taxes	140,478 49	157,737 19
Floating Debt Interest.....	142,430 17	159,928 64
Uncollectible Accounts.....	19,763 98	19,763 98
Administrative Expenses.....	167,894 60	167,894 60
Total Expenses.....	2,280,231 53	2,314,988 70
Net Operating Revenue.....	1,219,618 37	1,609,093 41
Reserves:		
Fire Insurance.....	45,953 81	45,953 81
Casualty Insurance.....	16,118.94	16,118 94
Annual Amortization of Depreciable Capital:		
Depreciation	385,919 79	385,919 79
Obsolescence, Inadequacy, Contingencies, etc.....	202,405 48	202,405 48
Total Reserves.....	650,398 02	650,398 02
Net Income.....	\$569,220 35	\$958,695 39

Issued by Auditing Department, San Francisco.

* The estimates in this column are based on the schedule of rates set forth in paragraph No. XVII of the annexed complaint.

EXHIBIT "C."

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

Gas Department.

Year Beginning July 1st, 1912, and Ending June 30th, 1913.

Gross Revenue:

Sales of Gas in San Francisco.....	\$3,142,714 50
Municipal Street Lighting Service.....	86,938 38
Rental of Gas Arcs.....	44,160 58
Sales of Gas to other Departments.....	36,927 48
Total Gross Revenue.....	\$3,310,740 94

Expenses:

Maintenance of Generating Capital.....	70,407 09
Maintenance of Distribution Capital.....	220,881 79
Generating Expenses.....	988,954 73
Distribution Expenses.....	625,487 67
Taxes.....	133,931 71
Floating Debt Interest.....	7,905 60

Uncollectible Accounts.....	22,068 23	
Administrative Expenses.....	166,449 77	
	<hr/>	
Total Expenses.....		2,236,086 59
Net Operating Revenue.....		1,074,654 35
Reserves:		
Fire Insurance.....	45,974 43	
Casualty Insurance.....	32,728 12	
Annual Amortization of Depreciable Capital:		
Depreciation	332,097 54	
Obsolescence, Inadequacy, Contingencies, etc.....	187,273 05	
	<hr/>	
Total Reserves.....		598,073 14
Net Income.....		476,581 21

Issued by Auditing Department, San Francisco.

Uncollectible Accounts.....	17,579 06	1,598 10	19,177 16	17,579 06	1,598 10	19,177 16
Administrative Expenses.....	149,333 78	13,575 79	162,909 57	149,333 78	13,575 79	162,909 57
Total Expenses.....	\$2,038,448 91	174,079 26	2,212,528 17	2,039,009 53	176,155 60	2,235,705 13
Net Operating Revenue.....	\$1,105,700 69	77,696 45	1,183,406 14	1,342,827 13	100,963 12	1,443,790 25

Issued by Auditing Department, San Francisco.

123

Net Operating Revenue (Brought Forward).....	\$1,105,700 69	77,696 45	1,183,406 14	1,342,827 13	100,963 12	1,443,790 25
Reserves:						
Fire Insurance.....	42,118 95	3,829 00	45,947 95	42,118 95	3,829 00	45,947 95
Casualty Insurance.....	20,301 53	1,845 59	22,147 12	20,301 53	1,845 59	22,147 12

Annual Amortization of Depreciable Capital:

Depreciation	340,625 62	30,965 97	371,591 59	340,625 62	30,965 97	371,591 59
Obsolescence, Contingencies, Inadequacies, etc.....	178,649 68	16,240 97	194,890 65	178,649 68	16,240 97	194,890 65
Total Reserves.....	581,695 78	52,881 53	634,577 31	581,695 78	52,881 53	634,577 31
Net Income.....	524,013 91	24,814 92	548,828 83	761,131 35	48,081 59	809,212 94

Issued by Auditing Department, San Francisco.

(Endorsed :) Filed July 3, 1914. Walter B. Maling, Clerk, By J. A. Schaertzer, Deputy Clerk.

124 In the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Answer.

To the Honorable the Judge of the District Court of the United States in and for the Northern District of California, Second Division:

Now comes the City and County of San Francisco, a municipal corporation, and James Rolph, Jr., Mayor of said City and County, defendants herein, and for answer to plaintiff's complaint herein admit, deny and allege as follows:

I.

Defendants admit the allegations in paragraphs 1, 2, 3, 4, 5 and 6 of plaintiff's complaint.

II.

Defendants admit that since the month of December, 1911, plaintiff has been engaged in the business of manufacturing, distributing and selling gas to the defendant, City and County of San Francisco and to its inhabitants, for light and heat purposes, but deny that plaintiff is now or ever has been the owner and in possession of the franchise of using the public streets and highways in said City and County of San Francisco, or of laying and maintaining therein mains and pipes, or of making connections therewith or of using such mains and pipes for the purpose of conveying and distributing to said City and County of San Francisco or to its inhabitants gas for light and heat purposes, or of charging and collecting for all gas furnished to said City and County and its inhabitants reasonable rates or compensation lawfully fixed by defendant, in the sense that such ownership or possession of a franchise implies any exclusive right or right other than that possessed by each and every person, firm or corporation furnishing or desiring to furnish gas for the use of said defendant or its inhabitants for heat or lighting purposes. Defendants admit the allegations contained in paragraph 7 of plaintiff's complaint, line 15 of page 5 to line 18 of page 6, inclusive. Defendants deny, however, that all of the plaintiff's plants, systems and other property in said paragraph mentioned,

are now or ever have been actually used by the plaintiff in conducting and transacting its aforesaid business of manufacturing and furnishing gas to the defendant and its inhabitants; deny that it was at the date of filing said complaint, or at any time since, necessary for the plaintiff to use all of the property described in said paragraph 7 in conducting its aforesaid business, in order to adequately and sufficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat. In

126 this behalf defendants allege that plaintiff owns and possesses large quantities of machinery and other apparatus, a very large quantity of street mains, a large amount of real estate, and a number of buildings which were not during the fiscal year 1914-15, as alleged, used or useful or necessary in supplying the City and County of San Francisco or its inhabitants with gas for purposes of light and heat.

III.

Answering paragraph 8 of said complaint, defendants admit that the franchise described in paragraph 7 thereof, is not exclusive; admit that the defendant or any other natural person or corporation may establish and operate in competition with the plaintiff, works for supplying defendant and its inhabitants with gas for purposes of light and heat, and allege that the right so to do, during the fiscal year 1914-15, was a right conferred by general law and not by a special grant of the defendant.

IV.

Defendants admit the allegations in paragraphs 9, 10 and 11 of plaintiff's complaint.

V.

Defendants have no information or belief which enables them to answer the first allegation of paragraph 12 of plaintiff's complaint, and, basing their denial on lack of such information or belief, defendants deny that plaintiff has caused a careful inventory and appraisalment, or any inventory or appraisalment of all or any of its properties in the City and County of San Francisco to be made by competent engineers and others possessed of expert knowledge concerning the matters submitted to them, or that plaintiff has carefully considered said inventory and appraisalment or the cost 127 of additions and extensions made subsequent to the making of said inventory, if it has been made. Defendants deny that the value, as of date of plaintiff's complaint, of the franchise, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in connection with plaintiff's established business or otherwise or at all, is the sum of \$17,227,900.00, as alleged in said complaint, or any sum whatever in excess of the sum of \$9,455,923.68; deny that the average value thereof during the year beginning July 1, 1914, and end-

ing June 30, 1915, was the sum of \$17,544,200.00, or any sum whatever in excess of \$9,605,196.06.

VI.

Answering paragraph 13 of plaintiff's complaint, defendants deny that the present reproduction value of that portion of the property therein described as subject to depreciation and diminution in value resulting from obsolescence or inadequacy, is or was on the 30th of June, 1914, if measured by the cost of replacing or reproducing said gas manufacturing plants and distributing systems with new plants of the same kind, capacity and efficiency, or if measured in any proper manner whatever, equal to the sum of \$13,177,400.00, or any sum whatever in excess of \$11,873,443.00; deny that during the year beginning July 1, 1914, it was necessary for plaintiff to make, or that plaintiff did make, additions, extensions or improvements of said plants and systems for the purpose of meeting the demands of the defendant and its inhabitants with gas to the extent of \$632,500, or any sum whatever in excess of \$496,751.00; deny that, as the result of any additions, extensions or improvements actually made by plaintiff during the fiscal year 1914-15, the average reproduction value of the property constituting plaintiff's plants and systems during said fiscal year was the sum of \$13,493,600.00, or any sum whatever in excess of \$12,228,414.80, making no allowance for accrued depreciation.

VII.

Defendants admit that the duly constituted committee of defendant's Board of Supervisors, held divers hearings during the months of February, March, April, May and June, 1914, for the purpose of determining fair and reasonable rates to be charged by plaintiff to the City and County of San Francisco and its inhabitants during the fiscal year 1914-1915, for furnishing gas for heating and lighting purposes; admit that at certain of said hearings plaintiff introduced statements verified by oath of its proper officers and oral evidence purporting to set forth the value of its aforesaid property and the necessity of its use; but deny that said statements or oral evidence correctly stated such value or necessity; deny that said statements or oral evidence correctly set forth the cost of manufacturing and distributing gas to the defendant or its inhabitants during the year beginning July 1, 1914, or the amount of gas which was demanded or purchased by the defendant or its inhabitants during said year, or any other facts which would enable said Board to ascertain and determine accurately what would be or constitute a reasonable return or compensation to be paid to plaintiff by the defendant and its inhabitants for gas furnished to them by the plaintiff during said fiscal year. Defendants admit that thereafter, the City and County of San Francisco, acting by its Board of Supervisors, did enact an ordinance on the 30th day of June, 1914, which was approved by the defendant's Mayor on the 30th day of June, 1914, and became

129 effective on the 1st day of July, 1914, fixing and establishing the quality and illuminating power of gas to be furnished to the defendant and its inhabitants, and fixing the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate and price to be charged for such gas during the year commencing July 1, 1914, and ending June 30, 1915; admit that "Exhibit A", attached to said complaint, is a true and correct copy of the last mentioned ordinance. Defendants admit that plaintiff protested against the adoption of said ordinance on various grounds; but deny that such protest was based upon any facts justifying same, and allege that said protest was based wholly upon the desire of plaintiff to have the supervisors fix rates which they properly and reasonably considered to be unjustly high, and which would be an unfair and unjust and excessive burden upon the defendant and its inhabitants if permitted to be charged.

VIII.

Defendants deny that the rate of seventy-five (75) cents per thousand cubic feet fixed by said ordinance was not during the year beginning July 1, 1914, or at any time subsequent thereto, a fair and just compensation for gas of the quality and illuminating power prescribed by said ordinance or furnished by plaintiff; deny that said rate was not at all or any times during said fiscal year sufficient to afford plaintiff reasonable and just compensation for the use of plaintiff's aforesaid property, in addition to the actual cost of manufacturing, distributing and selling such gas to the defendant or its inhabitants. In this behalf defendants allege that said rate is and was at all times during said fiscal year 1914-15, wholly just, reasonable and sufficient to afford the plaintiff reasonable and
 130 adequate compensation for the use of its aforesaid property and the cost of manufacturing, distributing and selling such gas as aforesaid. Further answering allegations contained in paragraph 15 of said complaint, defendants deny that the revenue received by plaintiff from the conduct of its business during the year beginning July 1, 1914, and ending June 30, 1915, if computed on the basis of the seventy-five (75) cent rate fixed by said ordinance, did not exceed the sum of \$3,499,849.00, but allege that said revenue actually received, if computed on the basis of said rate, was the sum of \$3,641,213.06. Defendants deny that the total amount of expense actually and properly incurred by plaintiff in conducting its said business and in operating its said gas manufacturing plants during said fiscal year, exclusive of the cost of replacements or sums which should have been set aside as reserve funds to cover actual depreciation and probable losses from fire, casualties, obsolescence, inadequacy or contingencies, or all of said sums, was the sum of \$2,280,231.00, or any sum whatever in excess of \$2,122,762.00. Defendants deny that a reasonable amount for the plaintiff to have set aside from its revenue during the year beginning July 1, 1914, and ending June 30, 1915, to cover depreciation and probable losses in

the conduct of its business, and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence or contingencies during said fiscal year was the sum of \$650,300, or any sum whatever in excess of \$514,136.56. Defendants deny that the net income which the plaintiff derived from the use of all its aforesaid property and from the conduct of its aforesaid business of manufacturing, distributing and selling gas to the defendant and its inhabitants for said fiscal year beginning July 1, 1914, did not exceed the sum of \$569,220.35, but allege that said net income exceeded the sum of \$1,004,313.00; deny that said income did not exceed three and twenty-five hundredths (3.25) per cent of the value of plaintiff's aforesaid property actually and necessarily used by plaintiff in manufacturing, distributing and selling gas to the defendant and its inhabitants during said fiscal year 1914-15, but allege that said net income actually exceeded 10.4 per cent thereon.

IX.

Answering paragraph 16 of said complaint, defendants deny that the several or any of the items making up the aggregate amounts of the plaintiff's estimated revenue, expenses or reserves for the year beginning July 1, 1914 and ending June 30, 1915, as shown in "Exhibit B" attached to said complaint, are correct, but allege that the actual experience of plaintiff in operating during said fiscal year demonstrates that said estimates were incorrect and erroneous. Defendants deny that the assumptions set forth in paragraph 16 of plaintiff's complaint are correctly made or that, with the exception of the first assumption, that said assumptions are reasonable or proper assumptions to be made, or that they were conservative or supported by facts which should be reasonably and properly considered in making the same. Defendants further allege that said assumptions have been rendered wholly irrelevant and immaterial by the fact that said fiscal year 1914-15 has expired, and that it is now possible for plaintiff to inform the court as to the actual income received during said fiscal year under said ordinance rates and the actual and reasonable cost incurred in manufacturing and distributing gas during said fiscal year to the defendant and its inhabitants, and the necessary and proper reserves to be set aside and charged during said fiscal year for depreciation, obsolescence, fire insurance, casualty insurance and any other contingencies.

X.

Answering paragraph 17 of said complaint, defendants admit that a rate of seventy-five (75) cents per thousand cubic feet for gas sold and delivered by plaintiff in the City and County of San Francisco was in effect during the fiscal year beginning July 1, 1912, and ending June 30, 1913, but deny that the statement contained in "Exhibit C" attached to plaintiff's complaint, purporting to show the gross revenue, expenses and reserves during said fiscal year, are correct, and in this behalf defendants allege that the items of ex-

penses and reserves shown in said exhibit contain many grossly excessive and improper charges against the cost of manufacturing, producing and distributing gas to plaintiff's consumers, of maintaining the plants necessary for the same, and many grossly excessive and improper charges to plaintiff's general administration account, none of which should be properly or equitably borne by plaintiff's rate payers or charged as an operating expense in determining the net revenue actually derived under said ordinance. Defendants make the same allegation with respect to plaintiff's accounts for fire and casualty insurance, and physical and functional depreciation. Further answering said paragraph 17 of plaintiff's complaint, defendants admit that by virtue of the temporary restraining order issued by this Honorable Court plaintiff did ignore the ordinance duly and lawfully adopted by the board of Supervisors of the City and County of San Francisco fixing a rate of seventy-five (75) cents for the fiscal year 1913-14, and did charge the schedule of rates

133 set forth in paragraph 17 of said complaint, with the exception of certain special rates given by plaintiff to large consumers of gas; but defendants deny that the actual gross revenue, expenses and reserves for the eleven months beginning July 1, 1913 and ending May 31, 1914, together with the estimated gross revenue, expenses and reserves for the month of June, 1914, are correctly shown in the statement attached to said complaint, marked "Exhibit D," or that the statement also shown in said "Exhibit D" of plaintiff's gross revenue, expenses and reserves on the basis of the seventy-five (75) cent rate, as authorized by ordinance, are correctly stated. In this behalf, defendants again aver that all of the estimates of expenses and reserves shown in said statement, "Exhibit D," are grossly excessive, and contain numerous improper and inequitable charges against plaintiff's consumers, not having any proper connection with the business of furnishing gas to said consumers or to the City and County of San Francisco. Defendants aver that if said improper charges to expenses and reserves are deducted, that the net return from said seventy-five (75) cent rate, as well as from the schedule of rates actually charged by plaintiff, will be shown to be very much in excess of the net return shown by said exhibits.

XI.

Answering paragraph 18 of plaintiff's complaint, defendants deny that plaintiff's properties used and useful during the fiscal year 1914-15 in furnishing gas to the City and County of San Francisco and its inhabitants are of the character or value set forth in said paragraph 18, and in this behalf defendants allege that the value of such property does not exceed the following sums, to-wit:

a. Lands of the value of.....	\$890,141.62
b. Gas manufacturing plants and distributing system	8,565,054.44
134 c. Working capital	150,000.00
d. Franchise—no monetary value whatever.	
e. Going concern, established business and good will as alleged,—all included and accounted for in total valuation of the plant here given, but no separate allowance made.	
Total.....	<hr/> \$9,605,196.06

Defendants further allege that there is no justification either in law or fact for the inclusion of a separate valuation for plaintiff's alleged franchise, or for the alleged elements of going concern, established business and good will. Defendants allege that none of these items have any value whatever separate and apart from the valuation of plaintiff's plant as hereinabove set forth.

XII.

Answering paragraph 19 of plaintiff's complaint, defendants deny that the sum of \$45,953.01, as therein alleged, does not exceed the cost to the plaintiff during said fiscal year to insure at the rate then prevailing in San Francisco in responsible fire insurance companies against loss and damage by fire, such of its property as was subject to destruction or damage by fire, but allege that said sum is very greatly in excess of the actual requirements of plaintiff during said fiscal year for an insurance reserve, and that the sum of \$10,000 is and was wholly reasonable and adequate for the purpose of such insurance during said fiscal year.

XIII.

Defendants deny that the item of \$16,118.94, as alleged in paragraph 20 of said complaint, did not exceed what it would cost or did cost plaintiff during said fiscal year 1914-15 to insure at the
135 rates then prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries, but allege that said sum is very greatly in excess of plaintiff's requirements for such purposes, and that the sum of \$15,000 is and was wholly adequate, reasonable and proper as a reserve for such casualty insurance during the said fiscal year.

XIV.

Answering paragraph 21 of said complaint, defendants deny that the average annual rate of depreciation of said plants and systems resulting from use, wear and the action of the elements, is 2.86 per cent of the reproduction value of said entire gas manufacturing plants and distributing systems, or that the item of \$385,919.79,

shown in "Exhibit B" attached to said complaint as a reserve for depreciation is, as a matter of fact, 2.86 per cent of the fair average reproduction value of the property which constituted said gas manufacturing plants and distributing systems during the year beginning July 1, 1914, or that said sum is a reasonable or conservative or proper amount for the plaintiff to reserve annually from its revenue as a fund for the replacement from time to time of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements. Defendants further deny that the sum of \$202,405.48 alleged in paragraph 22 of said complaint and in "Exhibit B" attached thereto is a reasonable or proper amount to set aside as a fund to cover probable losses resulting from obsolescence of parts of its said plants, inadequacy or contingencies, or to cover probable losses resulting from inevitable accident, extraordinary action of the elements, such as violent storms of
136 wind and rain and earthquake, and losses caused by acts of violence, riots and war, or that the sum amounts to only 1.5 per cent of the average reproduction value of the property constituting said gas manufacturing plants and distributing systems during the year beginning July 1, 1914; deny that it is reasonable or proper or necessary for plaintiff to carry any reserve whatever to cover possible losses from accident, extraordinary action of the elements, such as violent storms of wind and rain and earthquake, and losses caused by acts of violence, riots and war, but allege that all of said contingencies are purely speculative and hypothetical, and, if they constitute any element of risk at all, are elements which are incidental to the operation of any business, and a part of the hazard covered by the rate of return received therefrom; that, moreover, said items are incapable of reasonably accurate estimation or computation and are of such unusual and infrequent occurrence as to be negligible factors in determining the fairness or sufficiency of the ordinance rates in question. Further answering paragraphs 21 and 22 of said complaint, defendants allege that the percentage of 4 per cent of the reproduction value of depreciable property figured on a straight line basis, equivalent to the sum of \$489,136.56 for the fiscal year 1914-15 is a wholly sufficient, adequate and proper percentage and a wholly sufficient, adequate and proper amount to be set aside from plaintiff's earnings for said fiscal year as a reserve to cover depreciation, obsolescence, inadequacy and contingencies capable of estimation accruing to, or resulting from, the operation of plaintiff's said gas plant and properties during the said fiscal year.

XV.

137 Answering paragraph 23 of said complaint, defendants deny that from time to time said plants or systems have been or will hereafter be damaged or parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence; deny that only a portion of said loss and damage can be remedied by ordinary current repairs or replacements from

time to time out of plaintiff's current revenues, or that the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless, inefficient, or have been destroyed. Defendants deny that in order that the plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to the defendant and its inhabitants, that the plaintiff should set aside annually out of its revenue a sufficient sum to provide not only for current repairs, but also for such hypothetical replacements. Defendants deny that plaintiff has kept all the parts of its aforesaid plants and systems in good condition or repair, but allege in particular that plaintiff's gas distributing system has been and was at all times during said fiscal year 1914-15 in such poor state of repair that a very large percentage of gas leakage resulted, with consequent waste and expense to the plaintiff and plaintiff's gas consumers. Defendants admit that plaintiff's plants and systems were during said fiscal year adequate for supplying the demand of defendant and its inhabitants with gas; but allege that many items of said system were not efficient items, that they were needless duplications, and wastefully operated as the result of buying out the plaintiff's competitors of the previous years. Defendants therefore deny that said plants and systems have been constructed or maintained prudently or economically. Defendants deny that plaintiff has a right, as

138 alleged, to charge and collect for all gas furnished or sold by it to defendant and its inhabitants such compensation as will enable plaintiff not only to pay the expenses annually incurred by it in manufacturing and distributing gas, but also to set aside from its revenue and maintain reserve funds sufficient to provide for losses occasioned by wear and ordinary action of the elements, and contingencies or probable losses occasioned by fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war, and in addition thereto a reasonable annual return or profit upon the capital invested by the plaintiff in said plants, systems and business. In this behalf defendants deny that it is plaintiff's right to collect any rates whatever in excess of those determined by lawful authority to be reasonable, adequate and sufficient to compensate plaintiff for its actual proper cost of manufacturing and distributing gas, including ordinary depreciation and insurance reserve and a reasonable annual return upon capital used and useful and necessary in furnishing gas for heating and lighting purposes to defendant and its inhabitants. Defendants further deny that refusal to allow plaintiff to set up reserves for the purely speculative and hypothetical contingencies alleged in paragraph 25 of said complaint amounts to the taking of the use of plaintiff's entire invested capital without paying due compensation therefor.

XVI.

Defendants admit the propriety of allowing plaintiff a reasonable and adequate reserve for casualty insurance, and allege that the sum

of \$15,000 as aforesaid, is wholly adequate, reasonable and
130 sufficient for such purpose. Answering paragraph 26 of said
complaint, defendants deny that ever since plaintiff acquired
aforesaid gas manufacturing plants and distributing systems that
plaintiff has conducted, or is now conducting, its business of manu-
facturing, distributing and selling gas to the defendant and its in-
habitants economically or prudently, or has maintained or is now
maintaining its said plants and systems prudently or economically.
In this behalf defendants allege that many of plaintiff's expenses
of operation, and in particular its general administration expenses,
have been and were during the fiscal year 1914-15 grossly in excess
of the amounts which should have been charged under prudent and
economical management; that its reserves have been grossly over
estimated and are very grossly in excess of plaintiff's experienced
requirements during said fiscal years previous and subsequent
thereto, and that as the result of such grossly excessive operating
expenses and reserves any assumptions which are based thereon are
and were excessive and unreliable.

XVII.

Defendants deny that during the year 1913-14, or during the year
1914-15, it was necessary for plaintiff to pay a rate of interest of as
much as 7 per cent per year for money borrowed on security of its
aforesaid property, but allege that money could be secured during
both of said fiscal years upon much more favorable terms by corpora-
tions having monopoly and security of investment which char-
acterized the investment of plaintiff in its San Francisco gas business
during said years. Defendants deny that it was necessary for plain-
tiff or any other corporation, as hypothetically suggested, to earn a
net profit of at least one and one-half times the entire amount of
interest payable upon amounts of money borrowed upon such
140 security; deny that during said fiscal year 1914-15 that the
prevailing rate of interest in said City and County of San
Francisco for money loaned upon good real estate security at an
amount not exceeding 60 per cent of the value thereof was, or has
at any time since, been not less than 6 per cent net, the borrower
paying all taxes and other charges. In this behalf defendants al-
lege that very large sums of money were borrowed upon good real
estate security during said fiscal year, and since then at rates of
interest not greater than 5 per cent in the City and County of San
Francisco.

XVIII.

Answering paragraph 28 of said complaint, defendants deny that
a net profit of 8.5 per cent per year upon the value of plaintiff's
aforesaid property after paying all actual expenses of manufacturing,
distributing and selling gas, and after making reasonable provision
for depreciation and contingent and probable losses resulting from
fire, casualties, obsolescence, inevitable accident, acts of violence,

riots and war, is the minimum profit that will be reasonable compensation for the use of plaintiff's aforesaid property for the service rendered by plaintiff in conducting its said business under the then existing conditions. In this behalf defendants allege that the minimum profit of 5 per cent after making reasonable provision and allowance for operating expenses, depreciation and insurance reserves is reasonable and non-confiscatory compensation for the use of plaintiff's aforesaid property and for the service rendered by the plaintiff in conducting its said business under the conditions existing during the fiscal year 1914-15 aforesaid. Defendants deny that, under said existing conditions, *that* an ordinance or governmental act fixing rates to be charged by plaintiff for gas to be manufactured, distributed and sold by it to defendant and its
141 inhabitants which did not permit the plaintiff to earn by the use of its aforesaid plants and systems and property and from the conduct of its business a net profit of at least 8.5 per cent per year upon the value of such plants, systems and property, over and above operation expenses and reserve above indicated, or yield any percentage or profit greater than 5 per cent upon such value, after making such deductions and allowance, will operate to deny to the plaintiff the equal protection of the laws, or will deprive the plaintiff of its property, or of the use thereof, without just compensation or without due process of law, or in violation of the fourteenth amendment of the Constitution of the United States of America.

XIX.

Answering the paragraph 29 of said complaint, defendants deny that illuminating and fuel gas of the quality prescribed by the aforesaid ordinance has been at all times in said complaint mentioned, or now is, reasonably worth to the consumers thereof in said City and County of San Francisco the price set forth in the schedule of rates alleged, in paragraph 17 of said complaint, to have been charged by plaintiff, or that said rates set forth in said schedule are the lowest rates that will afford to plaintiff just or reasonable compensation for the gas furnished by it in said City and County of San Francisco, or that they are too low to afford to plaintiff reasonable compensation for the use of its aforesaid property. Defendants deny that the value of said service of supplying gas of said prescribed quality to consumers thereof in said City and County of San Francisco is greater than the rates fixed by ordinance of the Board of Supervisors, annexed to said complaint as "Exhibit A," and allege that
142 said rates are more than sufficient to furnish plaintiff a just and reasonable compensation for the gas furnished by it and for the use of its aforesaid property during said fiscal year. Defendants deny that said ordinance fixing the maximum price at seventy-five (75) cents per thousand cubic feet, deprives the plaintiff of the equal protection of the laws, or if enforced will deprive plaintiff of its property without just compensation and without due process of law, or is in violation of the fourteenth amendment to the Constitution of the United States of America.

XX.

Answering paragraph 30 of said complaint, defendants admit that said ordinance for the year beginning July 1, 1914, and fixing a maximum rate of seventy-five (75) cents per thousand cubic feet for gas was not enforced during said fiscal year, by reason of a temporary restraining order issued by this Honorable Court, but deny that said ordinance if enforced would have deprived the plaintiff of its property without just or reasonable compensation and without due process of law, or denied to the plaintiff the equal protection of the laws, or that said ordinance would have been repugnant to it or in violation of the fourteenth amendment to the Constitution of the United States of America, or that it would have been therefor null or void.

XXI.

Defendants allege that the allegations of paragraph 31 are wholly irrelevant and immaterial, inasmuch as the fiscal year 1914-15 is now past, and said ordinance was not enforced during said year by reason of the temporary restraining order issued by this Honorable Court. Answering paragraph 32 of said complaint, defendants deny that the plaintiff has no remedy except in equity for a complete determination of the invalidity of the said ordinance, or for the protection of plaintiff from the alleged deprivation
143 or alleged denial of plaintiff's right to the equal protection of the laws by the enforcement of said ordinance. Defendants further deny that in the absence of the remedy of injunction afforded by courts of equity, said ordinance would be enforced in violation of plaintiff's rights under the provisions of the fourteenth amendment of the Constitution of the United States, or of any other or all Constitution provisions, and denies the jurisdiction of this court to protect it from such alleged deprivations, because said deprivations did not as a matter of fact exist.

XXII.

Defendants admit that the matter in dispute exceeds, exclusive of interest and cost, the sum or value of three thousand dollars (\$3,000.00).

XXIII.

Answering paragraph 34 of said complaint, defendants aver that the allegations therein are now irrelevant and immaterial by reason of the fact that the fiscal year in question, being the fiscal year 1914-15, is now past, and the ordinance in question was, as a matter of fact, during said fiscal year enjoined by the restraining order of this court; but defendants deny that the balance of equities was or is in favor of the defendant; deny that the right of plaintiff to collect compensation in excess of that lawfully established by the

ordinance in question is greater than the right to each of the 100,000 alleged consumers of plaintiff to receive gas service at rates not in excess of those established by such ordinance; allege that the excessive rates which have been collected by plaintiff under permission of the said restraining order heretofore granted has worked great and irreparable injustice upon a very large number of
 144 plaintiff's said consumers; that many of said consumers have moved away, and that it is improbable that the amounts which they have paid plaintiff in excess of those lawfully established by such ordinance will ever be returned to them. Defendants allege that the proportion which said excess charges paid by each consumer bears to his total monthly income and monthly expenses is much greater relatively than the gross amount thereof is to the monthly expenses and monthly income of plaintiff. Defendants allege that plaintiff has collected and retained and has been enjoying the use of such excess sums for more than two years last passed, and that such collection has amounted to the deprivation of the property of plaintiff's consumers, and the imposition of an excessive and inequitable burden upon the same.

Wherefore defendants pray that plaintiff take nothing further by this suit in equity; that it be adjudged and decreed that the aforesaid ordinance is valid and that the rates therein prescribed are reasonable, non-confiscatory and adequate rates to be charged by plaintiff during the fiscal year 1914-15 for furnishing gas to the City and County of San Francisco and its inhabitants; that plaintiff be required to forthwith return to each of its consumers, in accordance with the order of this court, all sums collected from said consumers during said fiscal year in excess of those which should have been charged under the said ordinance rates, together with the interest thereon at legal rates from the date of each such collection; that defendants may have their costs in this proceeding incurred; and for such other equitable relief as to the court may seem meet and proper in the premises.

PERCY V. LONG,

City Attorney;

ROBERT M. SEARLE,

Assistant City Attorney;

Solicitors for Defendant.

145 UNITED STATES OF AMERICA,

Northern District of California,

City and County of San Francisco, ss:

James Rolph, Jr., being first duly sworn, deposes and says: That he is the duly elected and qualified Mayor of the City and County of San Francisco, named as Defendant in the above entitled action; that the foregoing answer and all and singular the allegations therein contained are true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said Defendant.

JAMES ROLPH, JR.

Subscribed and sworn to before me, this 13th day of December, 1916.

[SEAL.]

A. J. NAGLE,
*Notary Public of the State of California,
in and for the City and County of San Francisco.*

Service by copy of within original is hereby admitted this 14th day of December, 1916.

WM. B. BOSLEY,
Solicitor for Plaintiff.

Endorsed: Filed Dec. 15, 1916. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

146 At a stated term, to-wit, the March term, A. D. 1921, of the Southern Division of the United States District Court for the Northern District of California, Second Division, held at the court room, in the City and County of San Francisco, on Monday, the 6th day of June, in the year of our Lord one thousand nine hundred and twenty-one.

Present: The Honorable William C. Van Fleet, District Judge.

No. 97. Equity.

PACIFIC GAS & ELECTRIC CO.

vs.

CITY & COUNTY OF SAN FRANCISCO et al.

(Order Overruling Exceptions to Master's Report, etc.)

The exceptions of plaintiff and the exceptions of defendants, to the Master's report, heretofore submitted, being now fully considered and the opinion of Judge Rudkin being filed, it is ordered, in accordance with said opinion, that the exceptions to the report be overruled and that the report stand confirmed and that a decree be entered in accordance with said report.

147 In the Southern Division of the United States District Court
for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

Decree.

This cause having been referred on the 15th day of December, 1916, to the Honorable H. M. Wright, Standing Master in Chancery of the above entitled Court, for hearing, and the said Master having filed herein on the 2d day of March, 1920, his report thereon, and each of the parties herein having duly filed exceptions to said report, and said exceptions thereto coming on regularly for hearing in this Court on the 1st day of June, 1920, and the matter having been duly presented and argued by the parties and submitted to the Court on briefs for its consideration and decision, and the Court having duly considered the same and having on the 6th day of June, 1921, rendered its opinion and decision overruling plaintiff's exceptions to said report and confirming said report as filed, and the Court having ordered that a decree should be entered in accordance with the conclusions set forth in said opinion,

Now, therefore, in accordance with such order,

148 It is hereby ordered, adjudged and decreed that the said
report of said Master H. M. Wright, filed herein on the 2d
day of March, 1920, be and it is hereby confirmed, and that
all exceptions of the complainant to said report are hereby over-
ruled. The Court finds it unnecessary to pass upon the exceptions
of defendants.

It is hereby further ordered, adjudged and decreed that the ordinance of the Board of Supervisors of the City and County of San Francisco, passed on the 29th day of June, 1914, numbered Ordinance 2814, New Series, and set forth as Exhibit "A" to the complaint herein, and purporting to fix maximum rates to be charged for gas furnished to the City and County of San Francisco and its inhabitants during the fiscal year beginning July 1, 1914, and ending June 30, 1915, and the rates fixed by said ordinance afforded just and due compensation to complainant, are not a violation of the Fourteenth Amendment to the Constitution of the United States, and are reasonable and valid.

It is further ordered, adjudged and decreed that the preliminary restraining order heretofore granted in this case and all orders modifying the same be and they are hereby dissolved; that the plaintiff is hereby ordered and directed, within nine (9) calendar months

from and after the date of entry of this decree, to return to each of its consumers from whom it has collected any sum or sums of money in excess of the amounts which were properly chargeable at the rates fixed in said Ordinance No. 2814, New Series, for gas supplied to consumers while said ordinance was in effect, all of the excess sums so collected, together with interest thereon, to be computed as follows, viz.: interest at seven (7) per cent per annum on such excess sums from the respective dates of their collection to the date of entry of this decree, and also interest at seven (7) per cent

per annum on the total amount of said excess sums plus the
 149 interest so computed thereon, from the date of entry of this decree until the date at which said sums shall have been paid over to such consumers or to the Special Master of the Court for distribution as hereinafter provided, pursuant to the provisions of this decree; provided, that in order to minimize the labor and expense of computing the interest payable hereunder, methods of computation may be adopted involving the use of approximate averages of principal sums and of periods of time for which interest is payable which, in the opinion of the Special Master, will give substantially accurate results; provided, moreover, that the complainant may, and it is hereby authorized to deduct from the amount which is otherwise to be payable to any consumers under the terms of this decree, such sum or sums of money as may be due from such consumers to the complainant; provided, further, that prior to paying such amounts plaintiff may deduct therefrom such expenses as the Court has heretofore specified or may hereafter specify by order as a proper charge against said excess collections; and that the plaintiff at or before the expiration of said period of nine (9) months shall make a return to the Special Master hereinafter appointed by this Court, showing its compliance with this decree, together with the necessary books and vouchers supporting the same, and plaintiff shall pay to said Special Master at the time of making said return all of the unpaid balance which may be due to consumers under the provisions of this decree at the date of said return.

Said Special Master shall thereafter have sole and exclusive charge of locating the consumers entitled to such unpaid balance, or their legal representatives, and is hereby authorized and directed to pay to such consumers or their legal representatives when so located by him, the respective excess amounts due to them under the terms of this decree, out of the funds so deposited with him by plaintiff.
 150 In order to facilitate the work of said Special Master, at the time of depositing said excess amounts for the account of said consumers who have not been paid, the plaintiff shall deliver to said Special Master books or statements showing the names and last known addresses of said consumers who have not been paid and the exact amount of principal and interest due to each of said consumers. If the Special Master shall be unable to locate any of the consumers to whom such payments are due or their legal representatives, he shall hold the amounts respectively due to such consumers subject to the further order of the Court.

It is further ordered, adjudged and decreed that for the purpose

of assuring compliance with the provisions of this decree, Walter B. Maling, Clerk of this Court, is hereby constituted and appointed as Special Master of this Court, with full authority and duty to supervise the execution of the provisions of this decree under the direction of the Court, and is thus selected as Special Master for the reason that the claims to the fund will be extremely numerous, and their identity and the amount of their claims will have to be established by incessant reference to the books of complainant and the records of the Court, and such books and records can be most expeditiously and economically consulted by a Special Master, who is an officer of this Court. The expenses of said Special Master shall be hereafter fixed by the Court and shall be a charge against the funds in his hands, to be apportioned as the Court may hereafter direct. The Court hereby expressly retains jurisdiction of the subject matter of this litigation for the purpose of regulating the execution of the terms and conditions of this decree.

It is further ordered, adjudged and decreed that the defendants have and recover of and from the plaintiff their costs expended and incurred in this suit, taxed at \$590.57.

151 Dated June 28, 1921.

(Sgd.)

FRANK H. RUDKIN,
District Judge.

Endorsed: Filed and entered July 6, 1921. Walter B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

152 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Petition for Appeal to the Supreme Court of the United States.

To Honorable William C. Van Fleet, District Judge:

Pacific Gas and Electric Company, the plaintiff above named, conceiving itself to be aggrieved by the final decree made in the above entitled cause and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 4, does hereby appeal from said decree to the Supreme Court of the United States for the reasons specified in the assignment of errors which is filed herewith, and prays that its appeal be allowed, that citation be issued as provided by law, and that a transcript of the record, proceedings and papers upon which said

decree was based be duly authenticated and sent to the Supreme Court of the United States sitting at Washington in the District of Columbia.

153 Said plaintiff, desiring that said decree be superseded and that the execution thereof be stayed pending the determination of its appeal therefrom, tenders its bond with sureties in such amount as may be required for that purpose, and prays that a proper order be made by you fixing the amount of such bond and directing that, upon the filing and approval of such bond, said decree be superseded and the execution thereof be stayed.

WM. B. BOSLEY,
Solicitor for Plaintiff.

154 In the Southern Division of the District Court of the United State in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,
vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Order Allowing Appeal and Fixing Amount of Bond.

On motion of William B. Bosley, solicitor for plaintiff, it is hereby ordered as follows:

1. That the foregoing and annexed petition be granted and that plaintiff's appeal to the Supreme Court of the United States from the final decree mentioned in said petition be and the same is hereby allowed;

2. That a transcript of the record, proceedings, testimony, exhibits and papers upon which said decree was made be duly authenticated and transmitted to the Supreme Court of the United States;

3. That the amount of the bond on appeal to be filed by the plaintiff herein, the same to serve as a bond for costs and damages on appeal and also as a supersedeas bond, be fixed at the
155 sum of six hundred thousand dollars (\$600,000.00), and that such bond be executed by the plaintiff and two good and sufficient sureties; and

4. That, upon the filing and approval of such bond, said final decree shall be superseded and the execution thereof shall be stayed pending said appeal.

Done in open court this 13th day of September, 1921.

WM. C. VAN FLEET,
District Judge.

Endorsed: Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

156 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Assignment of Errors and Prayer for Reversal.

Now comes the plaintiff, Pacific Gas and Electric Company, by William B. Bosley, its solicitor, and respectfully says:

(a) That there is manifest error in the record, to-wit, in the Master's report on final hearing, the order confirming said report and the final decree, in the above-entitled suit which was brought by said plaintiff for the purpose of obtaining a decree enjoining and restraining the defendants herein from enforcing a certain ordinance adopted by the Board of Supervisors of defendant City and County of San Francisco which purported to fix, as the maximum rate or price to be charged for gas furnished to said City and County of San Francisco and its inhabitants during the year beginning July 1, 1914 and ending June 30, 1915, the sum of seventy-five cents per thousand cubic feet;

(b) That the ground upon which said plaintiff sought to enjoin the enforcement of said ordinance in said suit was that said
157 ordinance was void for repugnancy to the Fourteenth Amendment to the Constitution of the United States of America and particularly to those provisions of said amendment which declare that no state shall deprive any person of property without due process of law or deny to any person within its jurisdiction the equal protection of the laws; and

(c) That to said plaintiff the rights secured by the aforesaid provisions of the Fourteenth Amendment and the justice which is its due have been denied by said final decree which confirms the Master's report, adjudges said maximum rate to be just and reasonable and said ordinance to be valid and not repugnant to said provisions of said Fourteenth Amendment, and orders and directs said plaintiff to return, to each of its consumers from whom it collected any amount of money in excess of the amount authorized by said ordinance for gas supplied while said ordinance was in effect, the excess amount so collected together with interest thereon.

And now said plaintiff, appealing from said final decree to the Supreme Court of the United States, prays for the reversal of said decree, and assigns and sets out separately and particularly each error which it asserts and intends to urge as a ground for such reversal, as follows, viz.:

1. Said District Court erred in adjudging, in and by said final decree, that the maximum rate for gas, to-wit, seventy-five cents per thousand cubic feet, fixed by said ordinance, afforded just and due compensation to plaintiff, and that said ordinance was reasonable and valid and did not deprive said plaintiff of its property
158 without due process of law nor deny to said plaintiff the equal protection of the laws and was not repugnant to the afore-said provisions of the Fourteenth Amendment to the Constitution of the United States.

2. Said District Court erred in ordering and adjudging, in and by said final decree, that the preliminary restraining orders theretofore granted in said suit be dissolved, and that plaintiff return, to each of its consumers from whom it had collected any money in excess of the amount authorized by said ordinance for gas supplied while said ordinance was in effect, to-wit, during the period commencing July 1, 1914, and ending June 30, 1915, the excess amount so collected together with legal interest thereon.

3. Said District Court erred in confirming in and by said final decree said Master's report, and in overruling in and by said final decree said plaintiff's exceptions to said report, and particularly in overruling the exceptions hereinafter specified.

4. Said District Court erred in overruling plaintiff's fourth exception to the Master's report. A true copy of said fourth exception, as it appears in the plaintiff's "Objections to Draft Report of Standing Master in Chancery on Final Hearing", which, having been overruled by the Master, became exceptions to the Master's final report, by virtue of a stipulation made pursuant to rule of court, is as follows:

"Objection No. 4. Plaintiff objects to the mixed finding of fact and conclusion of law, as shown on pages 27 to 31 of said draft report, that the sum of \$612,931.61, being a part of the estimated
159 cost of cutting and relaying existing pavement included in the reproduction cost of plaintiff's gas distribution system in the City and County of San Francisco should be deducted and excluded from the reproduction cost of plaintiff's aforesaid structural property, because said sum of \$612,931.61 represents the estimated cost of cutting and relaying over gas mains and pipes certain pavement which is not shown by the evidence to have been laid before the laying of the gas mains and pipes now covered thereby and which consequently is not shown to have entered into the actual historical cost of plaintiff's existing gas distribution system."

5. Said District Court erred in overruling plaintiff's sixth exception to the Master's report. A true copy of said sixth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 6. Plaintiff objects to the mixed finding of fact and conclusion of law implied in the statement in the second paragraph of page 75 of said draft report, viz.: 'Accordingly, I shall determine the present value of plaintiff's plant and the reasonable annual allowance to reserve by the modified sinking fund method, including in the factors which have influenced the existing depreciation—the reserves which ought to be on hand—the effects of obsolescence and inadequacy as well as of physical deterioration.' The finding so implied is, in effect, that it is just and equitable to
160 determine the present value of plaintiff's aforesaid structural property and the reasonable annual allowances to be made to the plaintiff for accruing depreciation of such property caused by wear, physical deterioration, inadequacy and obsolescence all combined, by the application of the so-called Modified Sinking Fund Method as distinguished from the pure Sinking Fund Method."

The principal grounds of said sixth exception which are set forth in plaintiff's said objections are as follows:

"(b) This implied finding fails to make the natural and necessary distinction between (1) depreciation caused by gradual wear and gradual physical deterioration resulting from use and the known action of the elements, and (2) depreciation which results from causes fortuitous in their nature which include new inventions and discoveries resulting in obsolescence and changes in population and business resulting in inadequacy."

"(c) This implied finding, so far at least as it applies to the determination of the present value of plaintiff's structural property, is in conflict with the uncontradicted testimony of Mr. E. C. Jones with respect to the nature, use and present condition of by far the major part of plaintiff's aforesaid structural property."

6. Said District Court erred in overruling plaintiff's seventh exception to the Master's report. A true copy of said seventh exception, as it appears in plaintiff's said "objections to draft
161 report of standing master in chancery on final hearing", is as follows:

"Objection No. 7. Plaintiff objects to each of the following findings of fact shown on page 79 of said draft report viz:

(1) The amount of the existing depreciation which ought to be deducted from the average reproduction cost in order to ascertain the present value of plaintiff's said structural property was, for the year 1913-14, the sum of \$1,518,390.00, for the year 1914-15, \$1,780,411.00, and for the year 1915-16, \$1,493,162.00; and

(2) The proper annual allowance for accruing depreciation of plaintiff's said structural property was for the year 1913-14 the sum of \$348,853.00, for the year 1914-15 the sum of \$372,680.00, and for the year 1915-16, the sum of \$380,519.00."

7. Said District Court erred in overruling plaintiff's eighth exception to the Master's report. A true copy of said eighth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 8. Plaintiff objects to the Master's failure to find the present value of plaintiff's patent rights which are described and discussed on pages 84 to 87 of said draft report and his failure to include such value in his subsequent finding as to the present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants during the period beginning July 1, 1913, and ending June 30, 1916."

162 8. Said District Court erred in overruling plaintiff's ninth exception to the Master's report. A true copy of said ninth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 9. Plaintiff objects to the Master's failure to find that plaintiff is legally and equitably entitled to the savings in the manufacture of gas effected by its use of the apparatus and process invented by E. C. Jones and Leon B. Jones and protected by the patents described on page 84 of said draft report, in addition to a reasonable return upon its property necessarily and properly used in supplying gas to said City and County of San Francisco and its inhabitants exclusive of said patent rights."

9. Said District Court erred in overruling plaintiff's tenth exception to the Master's report. A true copy of said tenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 10. Plaintiff objects to the Master's finding shown on page 86 of said draft report to the effect that the savings attributed by the plaintiff to the use of the aforesaid patented apparatus and process were due in part to economies incident to the production of larger quantities of gas."

10. Said District Court erred in overruling plaintiff's eleventh exception to the Master's report. A true copy of said eleventh exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

163 "Objection No. 11. Plaintiff objects to the Master's finding of fact set forth on page 95 of said draft report to the effect that, during the entire period from July 1, 1913, to June 30, 1916, the additional value of plaintiff's property used and useful in supplying gas to the City and County of San Francisco and its inhabitants when viewed as a going concern and in connection with the

established business conducted by means thereof was the sum of \$1,500,000.00 and no more."

The principal grounds of said eleventh exception which are set forth in plaintiff's said objections are as follows:

"(a) Said finding with respect to 'going value' is not sustained by the evidence.

(b) The uncontradicted evidence introduced by plaintiff justifies and indeed compels the conclusion that the so-called 'going value' of plaintiff's aforesaid property was, during the entire period from July 1, 1913, to June 30, 1916, not less than the sum of \$3,000,000.00.

(c) The aforesaid finding with respect to 'going value' is essentially arbitrary because it is not supported by the evidence, but, on the contrary, clearly appears by the statement made on page 95 of said draft report to have been made in deference to what the Master conceived to be the meaning and effect of the opinion of Hon. Frank H. Rudkin rendered in passing upon the Master's report in the case of Spring Valley Water Company v. City and County of San Francisco, 252 Fed. 979, 985-6."

164 11. Said District Court erred in overruling plaintiff's twelfth exception to the Master's report. A true copy of said twelfth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 12. Plaintiff objects to the mixed finding of fact and conclusion of law shown in the last paragraph on page 98 of said draft report, 'that plaintiff's franchise has no separate or additional value beyond the sum of the values of its physical property, together with its going value already recognized in the foregoing appraisalment.'"

12. Said District Court erred in overruling plaintiff's thirteenth exception to the Master's report. A true copy of said thirteenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 13. Plaintiff objects to the Master's finding of fact with respect to the total value of plaintiff's used and useful gas property in San Francisco and the findings with respect to the items designated as 'structures' and 'going value,' set forth on page 101 of said draft report; and also objects to his failure to include in the total value of said property the reasonable value of its aforesaid patent right and franchise."

13. Said District Court erred in overruling plaintiff's fourteenth exception to the Master's report. A true copy of said fourteenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

165 "Objection No. 14. Plaintiff objects to the Master's mixed finding of fact and conclusion of law that plaintiff is not entitled to receive, in addition to the cost of operation and maintenance and a reasonable return upon the value of its property used and useful in supplying gas to its consumers in said City and County of San Francisco, a reasonable compensation for the service which it renders through the agency of its board of directors to its consumers by creating and maintaining an efficient organization of experienced men, by establishing a credit which enables it to obtain capital on favorable terms and by intelligently and efficiently directing and supervising such organization and the general conduct of its business whereby the service rendered to consumers is improved and economies are effected which normally result in the gradual reduction of cost of service to its consumers."

14. Said District Court erred in overruling plaintiff's fifteenth exception to the Master's report. A true copy of said fifteenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 15. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of ten thousand dollars (\$10,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of fire insurance."

15. Said District Court erred in overruling plaintiff's sixteenth exception to the Master's report. A true copy of said sixteenth exception, as it appears in plaintiff's said "objections to draft report
166 of standing master in chancery on final hearing," is as follows:

"Objection No. 16. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of fifteen thousand dollars (\$15,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of insurance against liability for personal injuries resulting from casualties."

16. Said District Court erred in overruling plaintiff's seventeenth exception to the Master's report. A true copy of said seventeenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 17. Plaintiff objects to the finding of fact that plaintiff is not entitled to any separate allowance in lieu of the cost of insuring its automobiles."

17. Said District Court erred in overruling plaintiff's nineteenth exception to the Master's report. A true copy of said nineteenth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 19. Plaintiff objects to the finding of fact set forth on page 111 of said draft report that the 'minimum fair rate of return that plaintiff was entitled to earn' upon the present value of its property used and useful in furnishing gas to the City and County of San Francisco and its inhabitants 'was seven per cent a year.'"

18. Said District Court erred in overruling plaintiff's twentieth exception to the Master's report. A true copy of said twentieth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 20. Plaintiff objects to the summaries and conclusions shown on pages 129 and 130 of said draft report to the extent that they embrace and involve the errors to which the foregoing objections Nos. 1 to 19 inclusive are directed upon the grounds hereinbefore set forth. With reference to the 'Ordinance Revenue' shown on page 130, plaintiff directs the Master's attention to the fact that plaintiff in its Exhibit No. 108 concedes that additions to its gross revenue as brought forward from Exhibit No. 38 should be made as follows, viz:

(1) For the year 1913-14 the sum of \$8,650.45 making the corrected gross revenue the sum of \$3,414,182.96;

(2) For the year 1914-15 the sum of \$6,151.53 making the corrected gross revenue the sum of \$3,641,213.06; and

(3) For the year 1915-16 the sum of \$16,881.18 making the corrected gross revenue the sum of \$3,801,565.03."

19. Said District Court erred in overruling plaintiff's twenty-first exception to the Master's report. A true copy of said twenty-first exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 21. Plaintiff objects to the Master's conclusion of law expressed on pages 130 to 134 of said draft report that the fact that the natural and necessary effect of the aforesaid ordinances, if enforced, was to compel plaintiff to furnish gas to a large number of consumers, to-wit, approximately twenty thousand, in each of the three years from July 1, 1913, to June 30, 1916, at less than actual cost exclusive of any return on capital, the loss thence arising exceeding \$22,000.00 per year, is immaterial in the determination of the issue as to the reasonableness of the rates prescribed by, and the constitutionality of, said ordinances."

20. Said District Court erred in overruling plaintiff's twenty-third exception to the Master's report. A true copy of said twenty-third exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 23. Plaintiff objects to the Master's conclusion that the ordinances of the Board of Supervisors of the City and County

of San Francisco fixing maximum rates for gas for the three years from July 1, 1913, to June 30, 1916, if they had been enforced, would have afforded plaintiff a fair return on the fair present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants."

21. Said District Court erred in overruling plaintiff's twenty-fourth exception to the Master's report. A true copy of said twenty-fourth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 24. Plaintiff objects to the Master's conclusion that the aforesaid ordinances provided a fair and just compensation for supplying gas to said City and County and its inhabitants and were valid under the Constitution of the United States."

169 22. Said District Court erred in overruling plaintiff's twenty-fifth exception to the Master's report. A true copy of said twenty-fifth exception, as it appears in plaintiff's said "objections to draft report of standing master in chancery on final hearing," is as follows:

"Objection No. 25. Plaintiff objects to the Master's conclusion that the defendant in said suits should have decrees in its favor dismissing the bills of complaint therein with costs to the defendant and with proper provisions for return by plaintiff to the consumers of charges over the rates fixed by said ordinances."

The "Draft Report of Standing Master in Chancery on Final Hearing" was substantially the same as the Master's "Report on Final Hearing," the only changes therein being those noted in the Master's "Supplemental Report" which is attached to and forms a part of said Master's "Report on Final Hearing"; and the references made in the above and foregoing assignments of error and the exceptions mentioned therein to said draft report apply to said report on final hearing, the paging of both being the same.

The above-mentioned Master's Report covers three similar cases designated as cases Nos. 27, 97 and 190 In Equity in the above-entitled court, which were consolidated for trial and referred for hearing to the Standing Master in Chancery. Consequently the plaintiff's exceptions to the Master's Report cover all three cases.

Wherefore, said appellant Pacific Gas and Electric Company prays that the aforesaid final decree in the above-entitled suit be reversed by the Supreme Court of the United States and that such further relief be granted as may be meet and equitable.

WM. B. BOSLEY,
Solicitor for Plaintiff and Appellant.

Endorsed: Filed Sept. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

- 170 In the Southern Division of the District Court of the United States, in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

*Bond on Appeal for All Damages and Costs to Operate as a
Supersedeas.*

Know all men by these presents that we, Pacific Gas and Electric Company, a corporation organized under the laws of the State of California and having its office and principal place of business in the City and County of San Francisco, state aforesaid, (being the plaintiff in the above entitled cause), as principal, and W. E. Creed and C. O. G. Miller, as sureties, are held and firmly bound unto City and County of San Francisco, a municipal corporation in the State of California, and James Rolph, Jr., Mayor of said City and County, (being the defendants in the above entitled cause), for the use and benefit of said defendants and for the use and benefit of all other persons to whom any sum of money is payable under and pursuant to the provisions of the decree hereinafter mentioned, according to their respective rights and interests, in the sum of six hundred thousand dollars (\$600,000.00) to be paid to said defendants for their own use and benefit and for the use and benefit of said other persons, their respective successors, executors, administrators or assigns, and for the payment of said sum as aforesaid well and truly to be made said principal binds itself, and its successors, and said sureties bind themselves and their respective heirs, executors and administrators, jointly and severally, firmly by these presents.

Whereas in the above entitled cause a final decree was made by the above entitled court and filed and entered in the office of the Clerk thereof on the 6th day of July, 1921; and

Whereas said principal has appealed, in the manner provided by law and the rules of court, from said final decree to the Supreme Court of the United States to reverse said decree:

Now, therefore, the condition of this obligation is such that, if said principal shall prosecute its said appeal to effect and, if it shall fail to make its plea good, shall answer all damages and costs, then this obligation shall be void, but otherwise shall remain in full force and virtue.

Sealed with our seals and dated this 12th day of September, 1921.
**PACIFIC GAS AND ELECTRIC COM-
 PANY,**

[Corporate seal.] By **JOHN A. BRITTON,**
Its Vice-President and General Manager.

Attest:

D. H. FOOTE,
Its Secretary.
W. E. CREED,
C. O. G. MILLER.

172 **STATE OF CALIFORNIA,**
City and County of San Francisco, ss:

On this 12th day of September, in the year 1921, before me, R. J. Cantrell, a notary public of the State of California, in and for said City and County of San Francisco, residing therein and duly commissioned and sworn, personally appeared John A. Britton, known to me to be the vice-president and general manager, and D. H. Foote, known to me to be the secretary, of Pacific Gas and Electric Company, the corporation which is named as principal in the above and foregoing instrument and which executed the same, and acknowledged that said corporation executed said instrument.

in witness whereof I have hereunto set my hand and affixed my official seal in said City and County of San Francisco the day and year in this certificate first above written.

[Notarial Seal.] **R. J. CANTRELL,**
Notary Public of the State of California,
in and for the City and County of San Francisco.

173 **UNITED STATES OF AMERICA,**
Northern Judicial District of California,
State of California,
City and County of San Francisco, ss:

W. E. Creed and C. O. G. Miller, being first duly sworn, each for himself deposes and says: That he is a resident and a freeholder in the Southern Division of the Federal Northern Judicial District of California and worth the sum of six hundred thousand dollars (\$600,000.00), exclusive of property exempt from execution and over and above all debts and liabilities; and they further severally acknowledged that they executed the annexed bond.

W. E. CREED.
C. O. G. MILLER.

Subscribed and sworn to before me this 13 day of September, 1921.

[SEAL.] **J. A. SCHAEERTZER,**
Deputy Clerk, U. S. District Court,
Northern District of California.

(Satisfactory to Defendants.)
R. M. SEARLS.

The within bond is approved. Sept. 13, 1921.

WM. C. VAN FLEET,
U. S. Dist. Judge.

Endorsed: Filed Sept. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

174 In the District Court of the United States in and for the Northern District of California, Second Division.

Case No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Bill of Complaint.

To the Honorable the Judges of the District Court of the United States in and for the Northern District of California, Second District:

Pacific Gas and Electric Company, plaintiff herein, brings this its bill of complaint against the City and County of San Francisco and James Rolph, Jr., defendants herein, and, for cause of action against the defendants herein alleges as follows:

I.

Plaintiff, whose name is Pacific Gas and Electric Company, is now, and ever since the 10th day of October, 1905, has been,
175 a corporation duly organized and existing under and by virtue of the laws of the State of California, and during all of said time has had and still has its office and principal place of business in the City and County of San Francisco, State aforesaid, and, within the meaning of the Acts of Congress defining the jurisdiction of the Courts of the United States, is a citizen of the State of California.

II.

Said City and County of San Francisco is now and during all of the times herein mentioned has been a political subdivision of the State of California and a municipal corporation duly incorporated, organized and existing under and by virtue of the constitution and laws of the State of California and a charter duly and regularly adopted, approved and established pursuant to the provisions of the said constitution, and is situate in the Northern Judicial Dis-

trict of California and, within the meaning of the Acts of Congress defining the jurisdiction of the courts of the United States, is a citizen of the State of California.

III.

Said James Rolph, Jr. is now and during all the times herein mentioned has been a resident of said City and County of San Francisco and a citizen of said State of California.

IV.

Said City and County of San Francisco, under and by virtue of the constitution and laws of the State of California and the charter under which it is incorporated, is invested with the power to make and enforce, within its limits, through the agency of its own officers, all local, police, sanitary and other regulations which
176 are not in conflict with general laws, and possesses, subject to the limitations contained in the constitution of the United States of America and the constitution of the State of California, the power to regulate the business of furnishing light, heat and power to itself and its inhabitants, and the power to fix and determine each year, by ordinance to take effect on the 1st day of July in such year, reasonable rates or compensation to be collected by any person or corporation for gas furnished to said City and County and its inhabitants for light and heat purposes, and the power to prescribe the quality of the service to be rendered by any and all persons engaged in furnishing gas for the purposes aforesaid, and the power to enforce, by its own executive officers and police courts, all ordinances enacted in the exercise of its aforesaid powers. Said City and County of San Francisco possesses the power to provide for lighting all of its public buildings and all of the public streets within its boundaries, and the power to compel the plaintiff to furnish all gas required for lighting such buildings and streets at such reasonable rates as it by its board of Supervisors shall from year to year establish.

V.

Said James Rolph, Jr. is now and ever since January, 1912, has been the Mayor of defendant, City and County of San Francisco, and as such is the chief executive officer of said City and required by its charter to see that all valid ordinances of said City and County are observed and enforced.

VI.

Said City and County of San Francisco does not own or control any public works for supplying itself or its inhabitants with arti-

177 ficial light, but has for many years provided for lighting with gas many of its public streets and public buildings by making contracts with the plaintiff and its predecessors in interest; and, under and pursuant to such contracts, plaintiff and its predecessors in interest have furnished all gas, labor, lamps and other materials and supplies required for lighting such public streets and buildings; and, under such a contract, the plaintiff is now lighting the defendant's public streets and public buildings and furnishing the gas, lamps, labor, materials and supplies required therefor.

VII.

Plaintiff is now and ever since the month of December, 1911, has been engaged in the business of manufacturing, distributing and selling gas to said City and County of San Francisco and to its inhabitants for light and heat purposes.

Plaintiff is now and ever since the month of December, 1911, has been the owner in fee simple and in possession of the franchise granted by section 19 of article XI of the Constitution of California of using the public streets and highways in said City and County of San Francisco and of laying and maintaining therein pipes and conduits and making connections therewith and of using such pipes and conduits for the purpose of conveying and distributing to said City and County and to its inhabitants gas for light and heat purposes, and of charging and collecting for all gas furnished to said City and County and its inhabitants reasonable rates or compensation subject only to the right of said City and County of San Francisco to regulate such rates or compensation as hereinbefore set forth. Plaintiff is now and ever since the month of December, 1911, has

178 been the owner and in possession of certain lands situate, in said City and County of San Francisco and certain lands in the County of San Mateo, State aforesaid, and of certain gas manufacturing plants erected thereon, consisting of machinery and apparatus used for manufacturing, generating, purifying and storing gas and the buildings wherein such machinery and apparatus are housed, and certain mains connecting said plants. Plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain gas distributing systems in said City and County of San Francisco, consisting of mains and pipes laid and maintained in the public streets and highways in said City and County of San Francisco under the authority of the aforesaid franchise and machinery, apparatus and appliances used for forcing into and through said mains and pipes the gas manufactured at the aforesaid plants, and valves and other appliances used for the purpose of regulating and controlling the distribution and delivery of gas and meters used for measuring the amounts delivered to its consumers. Plaintiff is now and ever since the month of December, 1911, has been the owner and in possession of certain other lands and divers warehouses constructed thereon which it uses for the purpose of storing appliances, materials and supplies necessary for use in the conduct of its said business, a parcel of land and an office

building erected thereon which it uses as a place wherein its officers and employees may transact its business, and a large amount of other property such as materials and supplies and working capital required for use in conducting its said business. All of plaintiff's plants, systems and other property hereinbefore mentioned are now actually being used by the plaintiff in conducting and transacting its
 179 aforesaid business of manufacturing and furnishing gas to the defendant and to its inhabitants; and it is now and will, during the entire year beginning July 1, 1915, and ending June 30, 1916, continue to be necessary for the plaintiff to use all of its aforesaid property in conducting its aforesaid business in order that it may adequately and efficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat.

VIII.

The aforesaid franchise owned by the plaintiff is not exclusive, but, under the constitution and laws of the State of California and the charter of said City and County of San Francisco, said City and County, or any natural person or private corporation, having first obtained from said City and County a grant of the right so to do, may establish and operate, in competition with the plaintiff, works for supplying said City and County and its inhabitants with gas for purposes of light and heat.

IX.

Plaintiff's aforesaid gas manufacturing plants and gas distributing systems are of such a nature or character that they are subject to deterioration as the natural result of use, and the action of the elements, and are also subject to obsolescence as the result of new inventions and discoveries and the usual and normal progress and advancement in the arts and sciences relating to the generation and distribution of gas.

X.

The demand of said City and County and its inhabitants for gas for purposes of light and heat has greatly increased for many
 180 years, is now increasing and the plaintiff verily believes will continue to increase. As the result of the increasing demand of said City and County and its inhabitants for gas, the plaintiff and its predecessors in interest have from time to time in the past found it necessary to replace parts of its gas manufacturing plants and gas distributing systems with larger apparatus, mains and appliances because the original apparatus, mains and other appliances had become inadequate for the increased service required by the increasing demand. The loss which the plaintiff and others in like situation must necessarily suffer by reason of the necessity arising periodically of substituting new and larger apparatus, mains and appliances for apparatus, mains and other appliances which, although

not obsolete, deteriorated or worn out, have become inadequate as the result of the increased demand for gas is now generally by accountants and public service commissions called "loss from inadequacy" as distinguished from loss arising from deterioration or obsolescence; and the term "inadequacy" wherever used herein is employed to denote loss of this character. All of the plaintiff's gas manufacturing plants and distributing systems are subject to diminution in value as the result of inadequacy as well as from obsolescence and ordinary deterioration.

XI.

Some parts of the plaintiff's aforesaid gas manufacturing plants and gas distributing systems are subject to damage and destruction by fire, inevitable accident, extraordinary action of the elements and acts of violence.

XII.

The plaintiff has caused a careful inventory and appraisalment of all of its aforesaid properties in the City and County of San Francisco and in the County of San Mateo to be made by competent engineers and others possessed of expert knowledge concerning the matters submitted to them, and has carefully considered said inventory and appraisalment and the cost of additions and extensions which have been made subsequent to the making of said inventory and appraisalment and is informed and verily believes and therefore says that the present value of the plaintiff's aforesaid franchise, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in connection with plaintiff's established business exceeds the sum of twenty million and twenty-five thousand dollars (\$20,025,000.00) and that the average value thereof during the year beginning July 1, 1915, and ending June 30, 1916, will exceed the sum of twenty million one hundred and eighty-six thousand dollars (\$20,186,000.00).

XIII.

Plaintiff, having carefully investigated and considered the inventory and appraisalment of its property above mentioned, is also informed and verily believes and therefore says that the present reproduction value of that portion of the aforesaid property which is subject to deterioration and to diminution of value resulting from obsolescence and inadequacy and which consists of the aforesaid gas manufacturing plants and distributing systems, that is to say, the value of said plants and systems measured by the cost of replacing the same with new plants and systems of the same kind, capacity and efficiency, exceeds the sum of thirteen million seven hundred and eighty-three thousand dollars (\$13,783,000.00); and that during the year beginning July 1, 1915, it will have to make and will make additions to, and extensions and improve-

ments of, said plants and systems for the purpose of meeting the demands of said City and County of San Francisco and its inhabitants for gas, and that the cost of such additions, extensions and improvements will not be less than the sum of three hundred and twenty-one thousand dollars (\$321,000.00), and that, as the result of the making of such additions, extensions, and improvements, the average reproduction value of the property constituting said plants and systems during the year beginning July 1, 1915, will exceed the sum of thirteen million nine hundred and forty-three thousand dollars (\$13,943,000.00).

XIV.

A committee of the Board of Supervisors of said City and County of San Francisco held divers hearings during the months of February, March, April, May and June, 1915, and at said hearings the plaintiff introduced statements verified by the oath of its proper officers and oral evidence to prove the value of its aforesaid property, the necessity of the use of said property for supplying said City and County and its inhabitants with gas, the cost of manufacturing and distributing gas to said City and County and its inhabitants during the year beginning July 1, 1915, the amount of gas which would be demanded and purchased by said City and County and its inhabitants during said year and other pertinent facts to enable said Board to ascertain and determine what will constitute a reasonable return or compensation to be paid by said City and County and its inhabitants for gas furnished to them by the plaintiff; and thereafter said City and County, acting by its Board of Supervisors, enacted an ordinance on the 28th day of June, 1915, which was
183 approved by defendant Rolph as Mayor of said City and County on the 29th day of June, 1915, and went into effect on the 1st day of July, 1915, prescribing the quality and illuminating power of gas to be furnished to said City and County and its inhabitants and fixing the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate and price to be charged for such gas during the year commencing July 1, 1915, and ending June 30, 1916. A true copy of the last mentioned ordinance is hereunto annexed, marked "Exhibit A" and made a part hereof. At the hearings before the said Board of Supervisors and before the adoption of said ordinance, plaintiff protested to said Board and to said Mayor that the rate of seventy-five (75) cents per thousand cubic feet for gas of the quality prescribed by said ordinance would be insufficient to afford to the plaintiff just or reasonable compensation for the gas to be furnished to said City and County and its inhabitants during said year, and that an ordinance establishing such a rate would be confiscatory, unconstitutional and void.

XV.

The rate fixed by the aforesaid ordinance, viz., seventy-five (75) cents per thousand cubic feet of gas, is not now and will not at any time during the year beginning July 1, 1915, be just or reason-

able compensation for gas of the quality and illuminating power prescribed by said ordinance, and is not now, and will not at any time during said year be, sufficient to afford to the plaintiff reasonable or just compensation for the use of plaintiff's aforesaid property in addition to the actual cost of manufacturing, distributing and selling such gas to said City and County and its inhabitants. The plaintiff,

184 having by its officers and agents, carefully investigated the facts and estimated the amount of gas which will probably be purchased by said City and County and its inhabitants during the said year beginning July 1, 1915, and the cost of manufacturing, distributing and selling the same, including the expense to be incurred in maintaining its aforesaid property, plants and systems and the amounts of money which should be set aside from its revenues as reserve funds to cover deterioration and probable losses from fire, casualties, obsolescence and inadequacy, during the year beginning July 1, 1915, and ending June 30, 1916, is informed and verily believes and therefore says:

1. The entire revenue which plaintiff will receive from the conduct of its said business and the use of its said property during the year beginning July 1, 1915, and ending June 30, 1916, if it shall not be permitted to charge and collect from the defendant and its inhabitants more than seventy-five (75) cents per thousand cubic feet for the gas to be furnished by it, will not exceed the sum of . . . \$3,840,825.21
 2. The total amount of expense which will actually be incurred by plaintiff in conducting its said business and in operating its said gas manufacturing plants and distributing systems during the year beginning July 1, 1915, exclusive of the cost of replacements which will actually be made and the amounts of money which should be set aside from its revenue as reserve funds to cover actual deterioration and probable losses to result from fire, casualties, obsolescence and inadequacy, will not be less than the sum of . . . \$2,425,476.97
- 185
3. A reasonable amount for the plaintiff to set aside from its revenues during the year beginning July 1, 1915, and ending June 30, 1916, to provide a fund to cover actual deterioration and probable losses in the conduct of its said business and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence and inadequacy, during said year beginning July 1, 1913, and ending June 30, 1916, will not be less than the sum of . . . \$669,991.75

4. The net income which the plaintiff will derive from the use of all of its aforesaid property and from the conduct of its business of manufacturing, distributing and selling gas to said City and County and its inhabitants for said year beginning July 1, 1915, will not exceed the sum of . . . \$745,356.49

5. Said net income will not exceed three and 69/100 (3.69) per cent of the present value of the plaintiff's aforesaid property which will be actually and necessarily used by the plaintiff in manufacturing, distributing, and selling gas to the defendant and its inhabitants during said year beginning July 1, 1915.

XVI.

The several items which make up the aggregate amounts of the plaintiff's estimated revenues, expenses and reserves for the year beginning July 1, 1915, and ending June 30, 1916, set forth in the last preceding paragraph of this complaint, are shown in a statement of the estimated revenues and costs of the plaintiff's gas department in said City and County of San Francisco, which is annexed hereto, marked "Exhibit B" and made a part hereof. The estimates set forth in said statement are based upon the following assumptions, viz:

1. That the rate per thousand cubic feet of gas to be sold to the inhabitants of said City and County of San Francisco for other than large manufacturing and industrial uses will be seventy-five (75) cents, and that the compensation for gas to be sold to said City and County and to consumers who use gas exclusively for large manufacturing and industrial uses will be as fixed by contracts now existing;

2. That the demand of said City and County and its inhabitants for gas will increase from the present time to the 30th day of June, 1916, at the same average rate as such demand has increased since July 1st, 1912, and that the total amount of gas to be sold and delivered by the plaintiff to said City and County and its inhabitants during the year beginning July 1, 1915, and ending June 30, 1916, will be five billion, fifty-two million, eight hundred and fifty-three thousand five hundred and twenty-one (5,052,853,521) cubic feet;

3. That the plaintiff's expenses and reserves for maintaining its capital during the year beginning July 1, 1915, will increase only in proportion to the actual increase of the capital invested in those parts of its said plants and systems which are subject to destruction, deterioration or diminution in value by fire, wear, action of the elements, obsolescence and inadequacy;

4. That plaintiff's other expenses will increase in proportion to the increase in the quantity of gas to be produced and sold by it to

said City and County and its inhabitants during said year beginning July 1, 1915; and

5. That, during the year beginning July 1, 1915, wages of labor and prices of materials and supplies to be used by plaintiff in its said business will be the same as they were during the year beginning July 1, 1914, and ending June 30, 1915.

Plaintiff is informed and verily believes and therefore says that the aforesaid assumptions are conservative and are supported by facts and by the experience of its officers who are now, and for many years have been, familiar with the business of manufacturing, distributing, and selling gas in said City and County of San Francisco, and that it is probable that wages and the prices of some of said materials and supplies will be higher during the year beginning July 1, 1915, than they were during the year beginning July 1, 1914.

XVII.

The plaintiff, in support of the estimate set forth in the last two preceding paragraphs of this complaint, and in said "Exhibit B", declares:

1. That it was permitted by the ordinance of said City and County of San Francisco then in force to charge and did charge the price of seventy-five (75) cents per thousand cubic feet, and no more, during the fiscal year beginning July 1, 1912, and ending June 30, 1913, for the gas sold by it to the inhabitants of said City and County; and that its gross revenue, expenses and reserves during said fiscal year are correctly shown in the statement which is hereunto annexed, marked "Exhibit C" and made a part hereof; and

2. That the ordinance of said City and County of San Francisco which was in force during the fiscal year beginning July 1, 1913, fixed seventy-five (75) cents per thousand cubic feet as the maximum price to be charged for gas; that seventy-five (75) cents per thousand cubic feet was the maximum price charged by plaintiff for gas from July 1st to August 31, 1913; that on or about the 18th day of July, 1913, this court, in an action commenced by plaintiff herein against said City and County of San Francisco and numbered 27 on the Clerk's Register of Suits in Equity in this court, made an order enjoining and restraining said defendant from enforcing the last mentioned ordinance; that on or about the 10th day of September, 1913, plaintiff adopted and put into effect in said City and County of San Francisco a schedule of rates, a true copy of which is as follows:

Eighty-five (85) cents per 1,000 cubic feet for each month in which the amount so delivered does not exceed 20,000 cubic feet;

Eighty-two and one-half (82½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 20,000 cubic feet, but does not exceed 30,000 cubic feet;

Eighty (80) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 30,000 cubic feet, but does not exceed 40,000 cubic feet;

189 Seventy-seven and one-half (77½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 40,000 cubic feet, but does not exceed 50,000 cubic feet;

Seventy-five (75) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 50,000 cubic feet;

that from the adoption of said schedule until June 30, 1914, plaintiff herein has actually charged for the gas sold by it to the inhabitants of said City and County of San Francisco, in accordance with said schedule of rates, except in cases where a lower rate was agreed upon and established by written contract for consumers for large manufacturing and industrial uses; that plaintiff's actual gross revenue, expenses and reserves for the fiscal year beginning July 1, 1913, and ending June 30, 1914, are correctly shown in the statement which is hereunto annexed, marked "Exhibit D" and made a part hereof; that said Exhibit D shows also what would have been plaintiff's gross revenue, expenses and reserves had it charged for the gas sold by it to the inhabitants of said City and County of San Francisco from July 1, 1913, to June 30, 1914, only the price of seventy-five (75) cents per one thousand cubic feet as authorized by the last mentioned ordinance; and

3. That the ordinance of said City and County of San Francisco which was in force during the fiscal year beginning July 1, 1914, fixed seventy-five (75) cents per 1,000 cubic feet as the maximum price to be charged for gas; that on or about the 3rd day of July, 1914, this court, in an action commenced by plaintiff herein against said defendants and numbered 97 on the Clerk's Register of Suits in Equity, made an order enjoining and restraining said defendants

190 from enforcing the last mentioned ordinance, and said order is still in full force and effect; that at all times during the year beginning July 1, 1914, and ending June 30, 1915, the plaintiff herein has actually charged for the gas sold by it to the inhabitants of said City and County of San Francisco in accordance with the schedule of rates which was adopted by the plaintiff on or about the 10th day of September, 1913, as aforesaid, except in cases where a lower rate was agreed upon and established by written contract for consumers for large manufacturing and industrial uses; that plaintiff's actual gross revenue, expenses and reserves for the eleven months beginning July 1, 1914, and ending May 31, 1915, and its estimated gross revenue, expenses and reserves for the month of June, 1915, are correctly shown in the statement which is hereunto annexed marked "Exhibit E" and made a part hereof; that said Exhibit E shows also what would have been plaintiff's gross revenue, expenses and reserves had it charged for the gas sold by it to the inhabitants of said City and County of San Francisco from July 1, 1914, to June 30, 1915, only the price of seventy-five (75) cents per one thousand cubic feet as authorized by the last mentioned ordinance.

XVIII.

Plaintiff's aforesaid properties used and useful at the present time in furnishing gas to said City and County of San Francisco and its inhabitants consist of the following:

	(a) Lands which exceed in value the sum of . . .	\$981,000.00
	(b) Gas manufacturing plants and distributing systems which exceed in value the sum of . .	13,783,000.00
191	(c) Working capital, including accounts receivable and cash on hand and required for current use, (but excluding material and supplies) the total value of which is approximately . .	359,000.00
	(d) The aforesaid franchise which exceeds in value the sum of	1,950,000.00
	(e) Going concern, established business and goodwill, which exceeds in value the sum of	2,952,000.00
	Total	\$20,025,000.00

XIX.

Plaintiff is informed and believes and therefore says that the item of forty-eight thousand and sixty-nine and 32/100 dollars (\$48,069.32) shown in said Exhibit B as a reserve for fire insurance for the year beginning July 1, 1915, does not exceed what it would cost plaintiff during said year to insure, at the rates now prevailing in San Francisco, in responsible fire insurance companies, against loss and damage by fire so much of its aforesaid property as is subject to destruction or damage by fire. Plaintiff is not now insuring its property against loss or damage by fire, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover fire losses. Plaintiff is informed and believes and therefore says that the reserve for fire insurance shown in said Exhibit B is reasonable and is based upon conservative estimates of fire risks.

XX.

Plaintiff is informed and believes and therefore says that the item of thirteen thousand nine hundred and sixty-nine and 82/100 dollars (\$13,969.82), shown in said Exhibit B as a reserve for casualty insurance for the year beginning July 1, 1915, does not exceed what it would cost plaintiff during said year to insure at the rates now prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries. Plaintiff is not now carrying casualty insurance, but has adopted the policy of setting aside from its revenues and establishing a reserve fund to cover liability to its employees and the public for personal injuries. Plaintiff is informed and believes and therefore says that the reserve for casualty insurance

shown on said Exhibit B is reasonable and is based upon conservative estimates of casualty risks.

XXI.

Plaintiff has caused a careful investigation and estimate to be made by skilled valuation engineers for the purpose of ascertaining the average annual rate of depreciation of the component parts of its aforesaid gas manufacturing plants and distributing systems resulting naturally from use and wear and the action of the elements and has been informed by said engineers and verily believes and therefore says that the average annual rate of depreciation of such plants and systems resulting from use, wear and action of the elements exceeds two and 86/100 (2.86) per cent of their reproduction value, and that the item of three hundred and ninety-eight thousand seven hundred and ninety-four and 60/100 dollars (\$398,794.60) shown in said Exhibit B as a reserve for depreciation is two and 86/100 (2.86) per cent of the average reproduction value of the property which will constitute said gas manufacturing plants and distributing systems during the year beginning July 1, 1915, and is a reasonable and conservative amount for the plaintiff to reserve annually from its revenues as a fund for the replacement from time to time of parts of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements.

XXII.

Plaintiff is informed and verily believes and therefore says that the item of two hundred and nine thousand one hundred and fifty-eight and 01/100 dollars (\$299,158.01) shown in said Exhibit B as a reserve for obsolescence, inadequacy, and contingent losses is a reasonable and proper amount to set aside as a fund to cover contingent or probable losses occasioned by obsolescence of parts of its said plants and systems, inadequacy as hereinbefore defined, inevitable accident, extraordinary action of the elements, acts of violence, riots and war, and amounts only to one and one-half (1½) per cent of the average reproduction value of the property which will constitute the said gas manufacturing plants and distributing systems during the year beginning July 1, 1915.

XXIII.

The component parts of plaintiff's aforesaid gas manufacturing plants and distributing systems are continually wearing out by use and diminishing in value by the ordinary action of the elements and from time to time become obsolete and inadequate and have to be repaired and replaced. From time to time plaintiff's said plants and systems have been and will hereafter, in all probability, be damaged and parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence. A portion

only of the deterioration and damage which result from the causes mentioned in this paragraph can be remedied by ordinary current repairs and replacements which are made from time to time out of plaintiff's current revenues and the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless or inefficient or have been destroyed. For the reasons set forth in this paragraph it is necessary, in order that plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to said City and County of San Francisco and its inhabitants, that plaintiff shall set aside annually out of its revenues a sufficient fund to provide not only for current repairs and replacements, but also for periodical replacements. Plaintiff has from time to time in the past repaired and replaced and is now from time to time repairing and replacing the component parts of its aforesaid plants and systems and has kept and is keeping the same in good condition and repair. Plaintiff's aforesaid plants and systems are now adequate and efficient for supplying the present demand of said City and County and its inhabitants with gas and have been constructed and maintained prudently and economically. It is the duty of plaintiff to maintain its said plants and systems in good order and condition so that the same shall at all times be adequate and efficient for serving said City and County and its inhabitants with gas, and from time to time to replace parts thereof and to make extensions, additions and betterments when required to meet the increased demand of said City and County and its inhabitants. As against said City and County of San Francisco in the exercise of the latter's power to fix the compensation to be charged and collected by plaintiff for gas furnished to said City and County and its inhabitants, plaintiff has the right to charge and collect for all gas furnished and sold by it to them such compensation as will enable plaintiff, not only to pay the expenses actually incurred by it in manufacturing and distributing gas, but also to set aside from its revenues and to maintain reserve funds sufficient to make reasonable provision to cover actual losses occasioned by wear and ordinary action of the elements and contingent or probable losses occasioned by fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war, and to have a reasonable annual return or profit upon the value of the aforesaid plants, systems and business. If plaintiff shall be allowed to collect rates or compensation only sufficient to enable it to pay the cost of manufacturing and distributing gas to said City and County and its inhabitants, including in such cost operating expenses, current expenses for repairs and maintenance, taxes, and a reasonable income or return upon the value of its aforesaid plants, systems and business, and shall not be allowed to collect in addition thereto an amount sufficient to make adequate provision to cover periodical and contingent losses and damage resulting from the causes hereinbefore specified, then, when said plants and systems shall have become worn out, obsolete or destroyed, plaintiff will have received from said City and County and its inhabitants only

reasonable income upon its aforesaid property, and its property will have been consumed or destroyed in the service of said City and County and its inhabitants and said City and County and its inhabitants will have appropriated and taken for their own use plaintiff's entire invested capital and the use thereof, but will have paid for nothing except such use.

XXIV.

Plaintiff in conducting its business of manufacturing and distributing gas to said City and County and its inhabitants necessarily employs a large number of officers, engineers, mechanics, and other skilled men and also unskilled laborers for whose acts in the course of their employment it is responsible. Plaintiff in conducting its said business at all times exercises a high degree of care in the employment and supervision of all of the men employed by it and in the conduct of its business; but, nevertheless, in the conduct of its said business and in the operation of its gas manufacturing plants and distributing systems, casualties do occur from time to time which result in injury to its employees, its consumers and to other persons under circumstances which give rise to legal liability on the part of plaintiff for the damage caused by such injury. For these reasons it is necessary for plaintiff to set aside from its revenue and to charge as a part of the cost of manufacturing and distributing gas to said City and County and its inhabitants a reasonable and sufficient sum annually to enable it to discharge all liabilities arising from the causes mentioned in this paragraph of this complaint.

XXV.

Plaintiff in conducting its aforesaid business necessarily hazards its invested capital in the same way and to the same extent as any other person who invests capital in business. Neither said City and County nor its inhabitants nor the State of California in any manner indemnifies or undertakes to indemnify plaintiff against loss of capital or loss of income suffered in the conduct of plaintiff's said business. If plaintiff's business of manufacturing and distributing gas to said City and County and its inhabitants at rates established by plaintiff itself or by said City and County shall prove unprofitable and if the income derived from such business shall not be sufficient to compensate plaintiff fully for the entire cost of manufacturing and distributing such gas, the loss resulting will have to be borne by plaintiff, and plaintiff has not the right of recouping such loss by charging said City and County or its inhabitants at any time any more than reasonable rates.

XXVI.

Plaintiff, ever since it acquired its aforesaid gas manufacturing plants and distributing systems has conducted and is now conducting

and will continue to conduct its business of manufacturing, distributing and selling gas to said City and County and its inhabitants economically and prudently and is now maintaining and will continue to maintain its said plants and systems prudently and economically; and all of the estimates hereinbefore set forth of the revenues to be derived by the plaintiff from the conduct of its aforesaid business and the use and operation of its aforesaid plants and systems and of all of the costs of manufacturing, distributing and selling gas to said City and County and its inhabitants, and of making provision for the maintenance and preservation of its said plants and systems are based upon the assumption that plaintiff will act prudently and economically in the conduct of its said business and in the maintenance and preservation of its said plants and systems.

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XXVII.

At no time during the past year has it been possible for plaintiff to borrow upon the security of its aforesaid property more than seventy-five (75) per cent. of its present value, or to borrow any large amount of money for a term of twenty years or more at a lower rate of interest than six and one-half ($6\frac{1}{2}$) per cent. per year, and at the present time plaintiff cannot borrow upon the security of its aforesaid property sufficient money to pay for necessary extensions, additions or betterments at a lower rate of interest than six and one-half ($6\frac{1}{2}$) per cent. per year. Money cannot be borrowed at the present time in any large amount for a long term upon terms as favorable as those already mentioned in this paragraph of this complaint, except by corporations or persons who have an established business and good credit and who can show that they derive from the use of the property hypothecated as security and from the conduct of their business a net profit amounting to at least one and one-half ($1\frac{1}{2}$) times the entire amount of interest payable upon the money borrowed upon such security. Plaintiff further shows that the prevailing rate of interest in said City and County of San Francisco for money loaned upon good real estate security to an amount not exceeding sixty (60) per cent. of the value thereof has been for more than one (1) year, is now, and probably will continue to be for a long time to come, not less than six (6) per cent. net, the borrower paying all taxes and other charges.

XXVIII.

Plaintiff is informed and believes and therefore says that a net profit of eight and one-half ($8\frac{1}{2}$) per cent. per year upon the value of its aforesaid property, after paying all actual expenses of manufacturing, distributing and selling gas and after making reasonable provision to cover ordinary and inevitable deterioration and contingent and probable losses resulting from fire, casualties, obsolescence, inevitable accident, violence, riots and war, is the minimum profit that will be reasonable compensation for the

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use of plaintiff's aforesaid property and for the service rendered by plaintiff in conducting its said business by means of its aforesaid property under existing conditions; and plaintiff further says that, under the existing conditions shown herein, any law or ordinance or governmental act fixing rates to be charged by plaintiff for gas to be manufactured, distributed and sold by it to said City and County and its inhabitants which will not permit plaintiff to earn by the use of its aforesaid plants, systems and property and from the conduct of its business a net profit of at least eight and one-half ($8\frac{1}{2}$) per cent. per year upon the value of such plants, systems and property, over and above the cost of operation and maintenance, and a reasonable allowance to cover actual ordinary deterioration and reasonable allowances or reserves to cover contingent or probable losses due to obsolescence, inadequacy, fire, casualties, extraordinary action of the elements, inevitable accident, acts of violence, riots, and war, will operate to deny to plaintiff the equal protection of the laws and to deprive plaintiff of its property and the use thereof without just compensation and without due process of law in violation of the fourteenth amendment to the Constitution of the United States of America.

XXIX.

200 Illuminating and fuel gas of the quality prescribed by the aforesaid ordinance, a copy whereof is hereunto annexed, has at all times herein mentioned been and is now reasonably worth to the consumers thereof in said City and County of San Francisco at least as much as the prices set forth in the schedule of rates contained in paragraph XVII of this complaint; and such prices are in fact too low to afford to plaintiff reasonable compensation for the use of its aforesaid property and the service which it renders by means thereof.

XXX.

For the reasons herein set forth the aforesaid ordinance, which was approved by the said Mayor June 29, 1915, and which fixes the maximum price to be charged for such gas at seventy-five (75) cents per thousand cubic feet, denies to plaintiff the equal protection of the laws, and, if enforced, will deprive plaintiff of its property without just compensation and without due process of law and therefore is repugnant to the fourteenth amendment to the Constitution of the United States of America and for that reason null and void.

XXXI.

Plaintiff is informed, verily believes and therefore says that the defendants will, notwithstanding the invalidity of said ordinance approved June 29, 1915, use and exercise the governmental power of the State of California to enforce the last mentioned ordinance during the period beginning July 1, 1915, and ending August 7,

1915, when defendants' jurisdiction in the premises will pass to the Railroad Commission of the State of California, and will, during said period, compel the plaintiff to supply the inhabitants of said City and County with gas at the price prescribed by the last mentioned ordinance, viz, seventy-five (75) cents per thousand cubic feet; and that, by reason of the acts of the defendants in enforcing said ordinance and compelling the plaintiff to supply gas upon the terms thereby prescribed, the plaintiff will be deprived by the State of California of its property and of the use of its property without just or reasonable compensation and without due process of law, and will be denied the equal protection of the laws in violation of the fourteenth amendment to the Constitution of the United States, unless defendants shall be restrained in accordance with the prayer of this complaint from enforcing the last mentioned ordinance.

XXXII.

Defendants herein have threatened and are now threatening and each of them has threatened and is now threatening to enforce immediately and continuously the aforesaid ordinance approved June 29, 1915, and all the provisions thereof, and, by means of criminal proceedings in the police courts of said City and County and otherwise, to compel plaintiff to supply gas to the inhabitants of said City and County at the rate of seventy-five (75) cents per thousand cubic feet. Plaintiff is informed and believes and therefore says that, if the plaintiff shall refuse or fail to comply with the provisions of said ordinance, or to supply gas to the inhabitants of said City and County at rates not exceeding the maximum prescribed by said ordinance, defendants will, through the officers and agents of said City and County, unless restrained by order of this court, institute many hundreds of actions in said police courts against plaintiff, its officers and agents to enforce the penalties prescribed by section 5 of said ordinance; and that, unless defendants shall be restrained by this court from enforcing said ordinance, many of the inhabitants of said City and County will, in case of plaintiff's refusing to furnish them with gas at a rate not exceeding the rate prescribed by said ordinance, institute many suits and actions at law to compel plaintiff to furnish them with gas at the rate prescribed by said ordinance, and to recover the penalties prescribed by section 629 of the Civil Code of California, viz., fifty dollars (\$50.00) and five dollars (\$5.00) per day for every day that plaintiff shall continue to refuse to furnish any applicant with gas at the rate prescribed by said ordinance, and that plaintiff will thereby be irreparably damaged and subjected to a multiplicity of suits and proceedings at law.

XXXIII.

Plaintiff is advised by its solicitor and therefore says that there is no remedy except in equity for a complete determination of the in-

validity of the aforesaid ordinance fixing gas rates for the fiscal year beginning July 1, 1915, and for the protection of plaintiff from being deprived of its property without due process of law and from the denial of its right to the equal protection of the laws by the threatened enforcement of said ordinance; and plaintiff further says that, in the absence of the remedy of injunction afforded by courts of equity, the said ordinance would be enforced by defendants in violation of plaintiff's rights under the provisions of the fourteenth amendment of the Constitution of the United States of America, and on this account plaintiff invokes the jurisdiction of this court to protect it against the threatened enforcement of the said ordinance and the threatened deprivation of its property without due process of law, and the threatened denial of its right to the equal protection of the laws in violation of the Constitution of the United States of America.

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XXXIV.

The matter in dispute in this action exceeds, exclusive of interest and costs, the sum or value of three thousand dollars (\$3,000.00).

XXXV.

In support of its prayer for a restraining order pending the hearing upon an order to show cause why a temporary injunction should not be issued pending the final determination of this suit, plaintiff shows that it has been and now is the practice of plaintiff to supply gas to said City and County and its inhabitants upon one month's credit in all cases where they request it so to do and give adequate security or establish their credit to the plaintiff's satisfaction; that more than one hundred thousand (100,000) of the inhabitants of said City and County are now being supplied by plaintiff with gas upon one month's credit at the rates set forth in the schedule contained in paragraph XVII of this complaint; that, unless a temporary restraining order shall be issued out of this court upon the filing of this complaint, plaintiff will be subjected to the penalties prescribed by the aforesaid ordinance, unless it shall accept payment at the rate of seventy-five (75) cents per thousand cubic feet for gas supplied subsequent to June 30, 1915, as prescribed by said ordinance approved June 29, 1915, and plaintiff will be unable to collect for such gas any greater compensation than the rate prescribed by said ordinance; and that plaintiff is now being deprived of its property without due process of law and being denied the equal protection of the laws and, until the issuance of a restraining order or an injunction pendente lite herein, will continue to
 204 be deprived of its property without due process of law, and to be denied the equal protection of the laws by the operation of the aforesaid ordinance and defendants' threatened enforcement thereof, in violation of the fourteenth amendment of the Constitution of the United States of America, and is suffering and will con-

tinue to suffer until the enforcement of said ordinance shall be enjoined by this court, immediate and irreparable loss and damage.

To the end therefore that plaintiff may have that relief which it can only obtain in a court of equity, and that defendants may answer the premises and all and singular the allegations herein contained (but not upon oath or affirmation, the benefit whereof is hereby expressly waived by plaintiff) plaintiff now prays:

1. That it be adjudged and decreed that the aforesaid ordinance approved June 29, 1915, is void and without force or effect, because it is in contravention of the fourteenth amendment to the Constitution of the United States of America; and, if enforced, will operate to deprive plaintiff of its property without due process of law and to deny to plaintiff the equal protection of the laws;

2. That it be adjudged and decreed that plaintiff has no adequate remedy at law for the injury and damage which would result to it from the threatened enforcement of said ordinance, and that such injury and damage would be irreparable;

3. That it be adjudged and decreed that plaintiff be granted writs, both temporary and permanent, of injunction, issuing out of and under the seal of this Honorable Court against defendants, enjoining and restraining them and all persons acting by or under their authority as officers, agents, servants employees or otherwise from in any way enforcing or attempting to enforce the said ordinance or any of the provisions thereof; and that, under and by virtue of the provisions of section 263 of the Judicial Code of the United States, a restraining order may be granted against defendants, their officers, agents, servants and employees, restraining them as hereinbefore stated, until this Honorable Court shall determine, upon motion and hearing, whether a temporary injunction of like purport and tenor as hereinbefore prayed for shall not be granted pendente lite;

4. That, if at any time hereafter and prior to the final hearing hereof, any person or persons shall attempt to enforce the provisions of said ordinance, or otherwise to act or proceed thereunder such person, or persons, or some of them on behalf of all, be made parties defendant herein, and each of them be enjoined and restrained as hereinbefore prayed; and that plaintiff have such further or other or different relief as to the court may seem meet and the nature of the case may require; and

5. That this Honorable Court grant unto plaintiff a writ of subpœna ad respondendum issuing out of and under the seal of this Honorable Court to be directed to said defendants, commanding each of them, on a certain day and under a certain penalty to be therein inserted, to appear before your Honors in this Honorable Court, and then and there full, direct, true and perfect answers make to all and singular the premises (but not upon oath or

206 affirmation, the benefit whereof is hereby expressly waived

by plaintiff); and further to stand, do, perform and abide by such order and decree as to your Honors may seem meet.

PACIFIC GAS AND ELECTRIC COMPANY,

By A. F. HOCKENBEAMER,

[Corporate Seal.] *Its Vice-President.*

WM. B. BOSLEY,

Solicitor for Plaintiff.

GARRETT W. McENERNEY,

Of Counsel for Plaintiff.

207 UNITED STATES OF AMERICA,
Northern District of California,
City and County of San Francisco, ss:

A. F. Hockenbeamer, being first duly sworn, deposes and says: That he is one of the vice-presidents and treasurer of the Pacific Gas and Electric Company, a corporation, which is the plaintiff named in the above and foregoing bill of complaint, and which has subscribed to the same; and that the said bill of complaint and all and singular the allegations therein contained are true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said corporation.

A. F. HOCKENBEAMER.

Subscribed and sworn to before me this 1st day of July, 1915.

[Notarial Seal.]

R. J. CANTRELL,

Notary Public of the State of California in
and for the City and County of San Francisco.

208 EXHIBIT A.

Bill No. 3656, Ordinance No. 3338 (New Series).—Fixing the minimum standard quality and illuminating power of gas and the maximum rate and price to be charged therefor, for the year commencing July 1, 1915, and ending June 30, 1916, or until rates shall have been fixed by the State Railroad Commission.

Be it Ordained by the People of the City and County of San Francisco as follows:

Section 1. The minimum standard quality and illuminating and heating power of gas to be furnished by any person, firm or corporation, to be used in the City and County of San Francisco, is hereby established at nineteen (19) candles, with a minimum heat value of 600 British thermal units.

The pressure shall not be less than two (2) inches nor more than nine (9) inches of water in height against the atmospheric pressure, said candle and heating power and pressure to be determined by the Board of Supervisors of the City and County of San Francisco.

Section 2. The maximum rate and price to be charged and collected therefor by any person, firm or corporation for furnishing gas for lighting, heating, or other purposes, to the City and County of San Francisco and the inhabitants thereof, for the year commencing July 1, 1915, and ending June 30, 1916, or until a rate and price for said purposes shall have been fixed by the State Railroad Commission under and by virtue of such authority as may have been conferred on said Commission by an act of the Legislature of the State of California, approved April 24, 1915 (Statutes of California 1915, Chapter 911), is hereby fixed at seventy-five (75) cents per thousand (1,000) cubic feet.

209 Section 3. A charge of fifty (50) cents for the maintenance of a meter during any month may be made to any consumer whose bill for the gas furnished during such month does not exceed fifty (50) cents, but in the event of such charge being made no further charge shall be made for gas furnished during said month to the consumer.

Section 4. All ordinances or parts of ordinances in conflict with the provisions of this ordinance are hereby repealed.

Section 5. Any person, firm or corporation or any officer or agent of any such person, firm or corporation, violating any of the provisions of this Ordinance shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding five hundred (500) dollars, or by imprisonment not exceeding six (6) months, or by both such fine and imprisonment, and such person, firm or corporation shall be guilty of a separate offense for every day that such violation shall continue, and shall be subject to the penalty imposed by this section for each separate offense.

Section 6. This Ordinance shall take effect and be in force on the first day of July, 1915.

Finally Passed—Board of Supervisors, San Francisco, June 28, 1915.

Ayes: Supervisors Deasy, Gallagher, Hayden, Hilmer, Hocks, Jennings, Kortick, McCarthy, McLeran, Murdock, Nelson, Payot, Power, Suhr, Walsh

Noes: Supervisor Nolan.

Absent: Supervisors Bancroft, Vogelsang.

J. S. DUNNIGAN,

Clerk.

Approved, San Francisco, June 29, 1915.

JAMES ROLPH, JR.,

Mayor.

EXHIBIT "B."

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

Gas Department.

Year Beginning July 1, 1915, and Ending June 30, 1916.

(Estimate based on Year July 1, 1914, to June 30, 1915.)

Gross Revenue:

	In accord- ance with ordinance rates.	Including revenue in excess of ordinance rates. *
Sales of Gas in San Francisco.....	\$3,641,286 13	\$4,023,538 64
Municipal Street Lighting Service.....	98,622 20	98,622 20
Rental of Gas Arcs.....	44,216 29	44,216 29
Sales of Gas to Other Departments.....	56,700 59	56,700 59
Total Gross Revenue.....	3,840,825 21	4,223,077 72

*The estimates in this column are based on the schedule of rates set forth in Paragraph No. XVII of the annexed complaint.

Statement of Revenue and Crsts.—Continued.

	In accord- ance with ordinance rates.	Including revenue in excess of ordinance rates. *
Expenses:		
Maintenance of Generating Capital.....	57,704 25	57,704 25
Maintenance of Distribution Capital.....	147,698 69	147,698 69
Generating Expenses.....	1,123,505 94	1,123,505 94
Distribution Expenses.....	645,585 39	645,585 39
Taxes.....	193,343 41	202,291 77
Floating Debt Interest.....	31,510 41	33,980 98
Uncollectible Accounts.....	35,277 28	35,277 28
Administrative Expenses.....	190,851 60	190,851 60
Total Expenses.....	2,425,476 97	2,436,895 90
Net Operating Revenue.....	1,415,348 24	1,786,181 82
Reserves:		
Fire Insurance.....	48,069 32	48,069 32
Casualty Insurance.....	13,969 82	13,969 82
Annual Amortization of Depreciable Capital:		
Depreciation.....	398,794 60	398,794 60
Obsolescence, Inadequacy, Contingencies, etc.....	209,158 01	209,158 01
Total Reserves.....	669,991 75	669,991 75
Net Income.....	\$745,356 49	\$1,116,190 07

Issued by Auditing Department, San Francisco.

*The estimates in this column are based on the schedule of rates set forth in Paragraph No. XVII of the annexed complaint.

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

Gas Department.

Year Beginning July 1, 1912, and Ending June 30, 1913.

Gross Revenue:

Sales of Gas in San Francisco.....	\$3,142,714 50
Municipal Street Lighting Service.....	86,938 38
Rental of Gas Ares.....	44,160 58
Sales of Gas to Other Departments.....	36,927 48

Total Gross Revenue.....	\$3,310,740 94
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Expenses:

Maintenance of Generating Capital.....	70,407 09
Maintenance of Distribution Capital.....	220,881 79
Generating Expenses.....	988,954 73
Distribution Expenses.....	625,487 67
Taxes.....	133,931 71
Floating Debt Interest.....	7,905 60
Uncollectible Accounts.....	22,068 23
Administrative Expenses.....	166,449 77

Total Expenses.....	2,236,086 59
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Net Operating Revenue.....	1,074,654 35
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Statement of Revenue and Costs.—Continued.

Reserves:

Fire Insurance	45,974 43
Casualty Insurance	32,728 12

Annual Amortization of Depreciable Capital:

Depreciation	332,097 54
Obsolescence, Inadequacy, Contingencies, etc.	187,273 05

598,073 14

Total Reserves

\$476,581 21

Net Income

Issued by Auditing Department, San Francisco.

EXHIBIT "D."

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

Gas Department.

Year Beginning July 1, 1913, and Ending June 30, 1914.

	In accordance with ordinance rates.	Including revenue in excess of ordinance rates.
Sales of Gas in San Francisco.....	\$3,221,011 60	\$3,505,337 31
Municipal Street Lighting Service.....	90,138 48	90,138 48
Rental of Gas Arcs.....	48,298 64	48,298 64
Sales of Gas to Other Departments.....	46,083 79	46,083 79
Total Gross Revenue.....	3,405,532 51	3,689,858 22

Statement of Revenue and Costs.—Continued.

Expenses:

Maintenance of Generating Capital.....	48,447 74	48,447 74
Maintenance of Distribution Capital.....	157,986 43	157,986 43
Generating Expenses.....	981,342 28	981,342 28
Distribution Expenses.....	575,919 33	575,919 33
Taxes.....	144,130 76	149,795 93
Floating Debt Interest.....	27,874 69	29,710 24
Uncollectible Accounts.....	27,489 45	27,489 45
Administrative Expenses.....	162,382 40	162,382 40
Total Expenses.....	2,125,573 08	2,133,073 80
Net Operating Revenue.....	1,279,959 43	1,556,784 42

Reserves:

Fire Insurance.....	47,817 60	47,817 60
Casualty Insurance.....	21,828 86	21,828 86

Annual Amortization of Depreciable Capital:

Depreciation.....	370,693 27	370,693 27
Obsolescence, Inadequacy, Contingencies, etc.....	194,419 55	194,419 55
Total Reserves.....	634,759 28	634,759 28
Net Income.....	\$645,200 15	\$922,025 14

Issued by Auditing Department, San Francisco.

(Here follows Exhibit "E" marked page 213.)

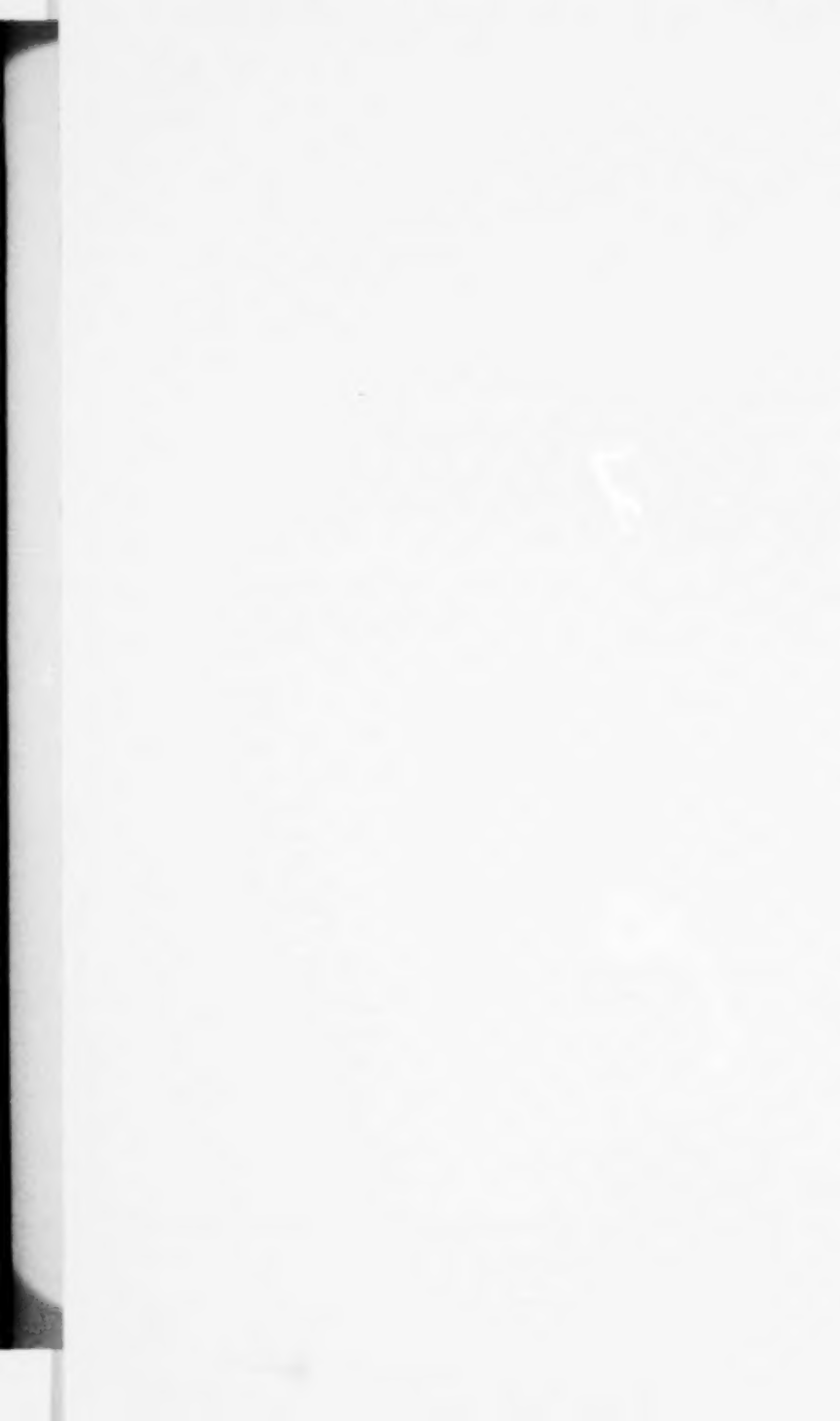


EXHIBIT "E."

Pacific Gas and Electric Company.

Statement of Revenue and Costs.

San Francisco District.

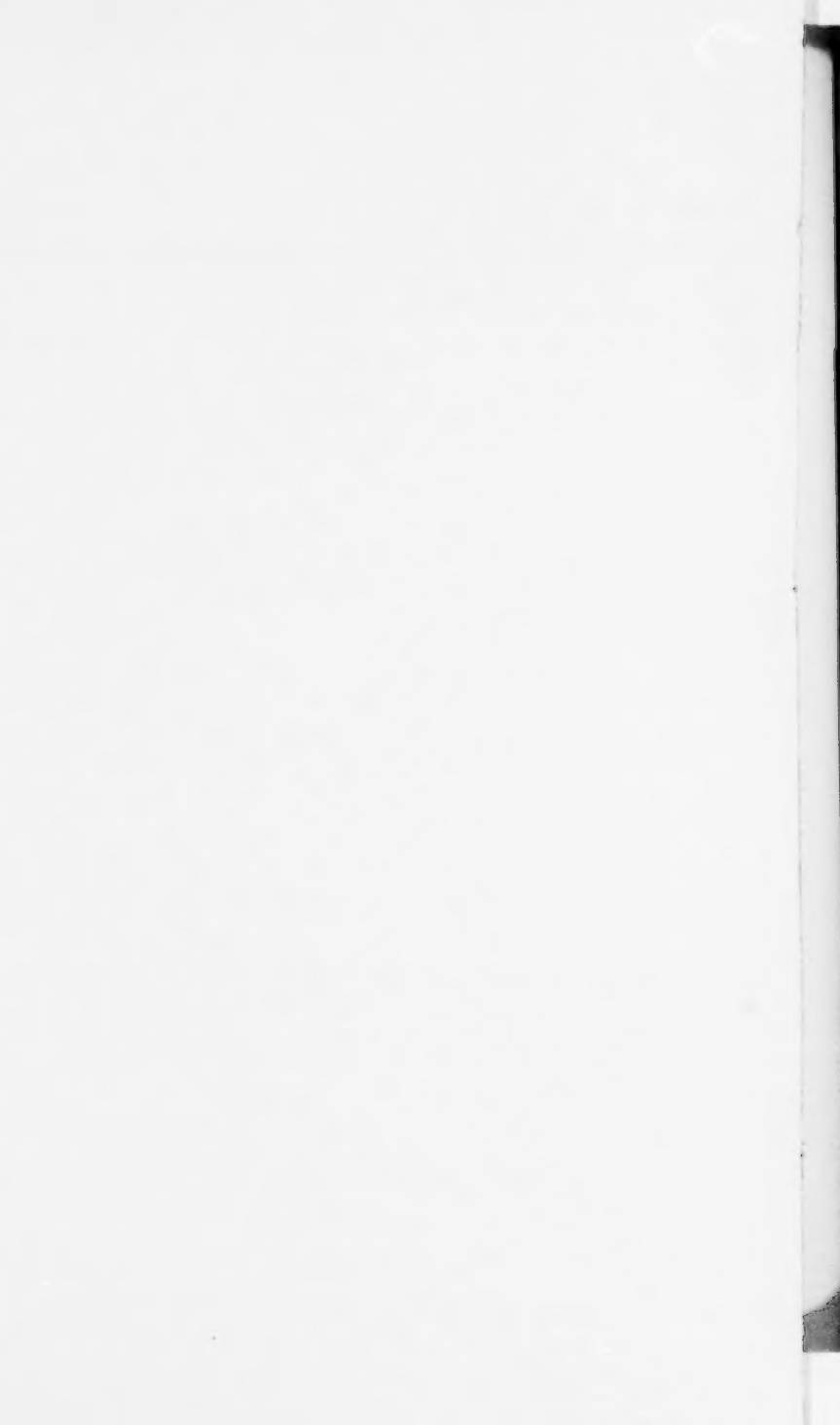
Gas Department.

Year July 1, 1914, to June 30, 1915.

	In accordance with ordinance rates.			Including revenue in excess of ordinance rates.		
	July 1, 1914, to May 31, 1915.	June, 1914 (estimated).	Total.	July 1, 1914, to May 31, 1915.	June, 1914 (estimated).	Total.
Gross Revenue:						
Sales of Gas in San Francisco.....	3,168,975 97	280,191 53	3,449,167 50	3,502,416 77	308,835 14	3,811,251 91
Municipal Street Lighting Service.....	85,421 19	7,997 58	93,418 77	85,421 19	7,997 58	93,418 77
Rental of Gas Ares.....	38,802 44	3,080 95	41,883 39	38,802 44	3,080 95	41,883 39
Sales of Gas to Other Departments.....	48,798 76	4,910 24	53,709 00	48,798 76	4,910 24	53,709 00
Total Gross Revenue.....	3,341,998 36	296,180 30	3,638,178 66	3,675,439 16	324,823 91	4,000,263 07
Expenses:						
Maintenance of Generating Capital.....	51,274 87	3,384 83	54,659 70	51,274 87	3,384 83	54,659 70
Maintenance of Distribu'n Capital.....	130,021 97	9,883 96	139,905 93	130,021 97	9,883 96	139,905 93
Generating Expenses.....	979,909 81	84,467 65	1,064,377 46	979,909 81	84,467 65	1,064,377 46
Distribution Expenses.....	562,155 34	49,503 80	611,659 14	562,155 34	49,503 80	611,659 14
Taxes.....	147,428 64	13,039 46	160,468 10	154,285 26	13,609 83	167,895 09
Floating Debt Interest.....	27,422 47	2,425 41	29,847 88	29,578 88	2,609 22	32,188 10
Uncollectible Accounts.....	30,631 34	2,784 67	33,416 01	30,631 34	2,784 67	33,416 01
Administrative Expenses.....	165,716 87	15,065 17	180,782 04	165,716 87	15,065 17	180,782 04
Total Expenses.....	2,094,561 31	180,554 95	2,275,116 26	2,103,574 34	181,309 13	2,284,883 47
Net Operating Revenue.....	1,247,437 05	115,625 35	1,363,062 40	1,571,864 82	143,514 78	1,715,379 60
Reserves:						
Fire Insurance.....	44,063 55	4,005 77	48,069 32	44,063 55	4,005 77	48,069 32
Casualty Insurance.....	12,859 57	1,088 73	13,948 30	12,859 57	1,088 73	13,948 30
Annual Amortization of Depreciable Capital:						
Depreciation.....	350,187 00	31,835 18	382,022 18	350,187 00	31,835 18	382,022 18
Obsolescence, Inadequacy, Contingencies, etc..	183,664 52	16,696 77	200,361 29	183,664 52	16,696 77	200,361 29
Total Reserves.....	590,774 64	53,626 45	644,401 09	590,774 64	53,626 45	644,401 09
Net Income.....	656,662 41	61,998 90	718,661 31	981,090 18	89,888 33	1,070,978 51

Issued by Auditing Department, San Francisco.

Endorsed: Filed Jul. 2, 1915. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.



214 In the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Stipulation.

Whereas Ordinance No. 3338 (New Series) of the City and County of San Francisco, the enforcement of which was temporarily restrained by an order made in the above entitled suit on or about the 7th day of July, 1915, did not by its terms continue in force after June 30, 1916; and

Whereas there is now pending before the Railroad Commission of the State of California a proceeding instituted by the City and County of San Francisco, one of the defendants herein, for the purpose of obtaining an order of said Commission fixing and establishing the rates to be charged for gas in said City and County
215 of San Francisco from and after the making of such order; and

Whereas the hearing upon said application has not yet been concluded and no order has been made in said proceeding fixing the rates to be charged for gas; and

Whereas it is the desire of the parties hereto that the rights and interests of the gas consumers in the City and County of San Francisco shall be adequately protected;

Now, therefore, it is mutually stipulated by and between the parties to the above entitled suit as follows:

1. Plaintiff will continue to keep a separate set of books in all respects as required by the aforesaid order made herein July 7, 1915, until said Railroad Commission shall have made and put into effect in the aforesaid proceeding now pending before it an order fixing and establishing the rates for gas in the City and County of San Francisco;

2. If it shall be determined by the final decree to be entered in this suit that the aforesaid Ordinance No. 3338 (New Series) is constitutional and valid, then the plaintiff will, within a definite time to be fixed in such final decree, deliver to the Clerk of this Court, or to a special master as directed by such decree, said set of books and also pay into Court, or to the consumers from whom the
216 same shall have been collected, as directed by such decree, the full amount of all sums of money collected by plaintiff

in excess of the rates fixed by the aforesaid ordinance, until said Railroad Commission shall have established in the aforesaid proceeding the rates for gas to be charged and collected in San Francisco and also legal interest upon such sums from the date of collection; and

3. Plaintiff hereby irrevocably consents that the above entitled Court, when it makes its final decree in this suit, may provide in such decree for the enforcement of this stipulation in the same manner as if the aforesaid ordinance had continued in force until the establishment of gas rates for the City and County of San Francisco by said Railroad Commission.

Witness our hands this 31st day of August, 1916.

WM. B. BOSLEY,
Solicitor for Plaintiff.

GARRET W. McENERNEY,
Of Counsel for Plaintiff.

PERCY V. LONG,
R. M. SEARLS,
Solicitors for Defendants.

The making of the above and foregoing stipulation by the Plaintiff's solicitor is hereby ratified, approved and confirmed.

Witness the corporate name and seal of Pacific Gas and Electric Company, plaintiff herein, this 31st day of August, 1916.

PACIFIC GAS AND ELECTRIC COMPANY,
By JOHN A. BRITTON,
Its Vice-President and General Manager.

(Corporate Seal.)

Attest:

D. H. FOOTE,
Its Secretary.

Endorsed: Filed Sep. 18, 1916. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

217 In the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Answer.

To the Honorable the Judges of the District Court of the United States in and for the Northern District of California, Second Division:

Now comes the City and County of San Francisco, a municipal corporation, and James Rolph, Jr., Mayor of said City and County, defendants herein, and for answer to plaintiff's complaint herein admit, deny and allege as follows:

I.

Defendants admit the allegations in paragraphs 1, 2, 3, 4, 5 and 6 of plaintiff's complaint.

II.

218 Defendants admit that since the month of December, 1911, plaintiff has been engaged in the business of manufacturing, distributing and selling gas to the defendant, City and County of San Francisco and to its inhabitants, for light and heat purposes, but deny that plaintiff is now or ever has been the owner and in possession of the franchise of using the public streets and highways in said City and County of San Francisco, or of laying and maintaining therein mains and pipes, or of making connections therewith or of using such mains and pipes for the purpose of conveying and distributing to said City and County of San Francisco or to its inhabitants gas for light and heat purposes, or of charging and collecting for all gas furnished to said City and County and its inhabitants reasonable rates or compensation lawfully fixed by the defendant, in the sense that such ownership or possession of a franchise implies any exclusive right or right other than that possessed by each and every person, firm or corporation furnishing or desiring to furnish gas for the use of said defendant or its inhabitants for heat or lighting purposes. Defendants admit the allegations contained in paragraph 7 of plaintiff's complaint, line 27 of page 4 to 26 of page 5, inclusive. Defendants deny, however,

that all of the plaintiff's plants, systems and other property in said paragraph mentioned, are now or ever have been actually used by the plaintiff in conducting and transacting its aforesaid business of manufacturing and furnishing gas to the defendant and to its inhabitants; deny that it was at the date of filing said complaint, or at any time since, necessary for the plaintiff to use all of the property described in said paragraph 7 in conducting its aforesaid business, in order to adequately and sufficiently serve the said City and County of San Francisco and its inhabitants with gas for purposes of light and heat. In this behalf defendants allege that plaintiff owns

219 and possesses large quantities of machinery and other apparatus, a very large quantity of street mains, a large amount of real estate, and a number of buildings which were not during the fiscal year 1915-16, as alleged, used or useful or necessary in supplying the City and County of San Francisco or its inhabitants with gas for purposes of light and heat.

III.

Answering paragraph 8 of said complaint, defendants admit that the franchise described in paragraph 7 thereof, is not exclusive; admit that the defendant or any other natural person or corporation may establish and operate in competition with the plaintiff, works for supplying defendant and its inhabitants with gas for purposes of light and heat, and allege that the right so to do, during the fiscal year 1915-16, was a right conferred by general law, and not by a special grant of the defendant.

IV.

Defendants admit the allegations in paragraphs 9, 10 and 11 of plaintiff's complaint, except that defendants deny that the alleged elements of "inevitable accident, extraordinary action of the elements and acts of violence," are ascertainable risks, or that they affect the security of plaintiff's investment.

V.

Defendants have no information or belief which enables them to answer the first allegation of paragraph 12 of plaintiff's complaint, and, basing their denial on lack of such information or belief, defendants deny that plaintiff has caused a careful inventory and appraisement, or any inventory or appraisement of all or any of its properties in the City and County of San Francisco to be made by competent engineers and others possessed of expert knowledge
220 concerning the matters submitted to them, or that plaintiff has carefully considered said inventory and appraisement or the cost of additions and extensions made subsequent to the making of said inventory, if it has been made. Defendants deny that the value, as of date of plaintiff's complaint, of the franchise, lands, gas manufacturing plants, gas distributing systems and other property taken as a whole and considered as a going concern in con-

nection with plaintiff's established business or otherwise or at all, is the sum of \$20,025,000.00, as alleged in said complaint, or of any sum whatever in excess of the sum of \$9,216,307.00; deny that the average value thereof during the year beginning July 1, 1915, and ending June 30, 1916, was the sum of \$20,186,000.00, or any sum whatever in excess of \$9,341,307.00.

VI.

Answering paragraph 13 of plaintiff's complaint, defendants deny that the present reproduction value of that portion of the property therein described as subject to depreciation and diminution in value resulting from obsolescence or inadequacy, is or was on the 30th of June, 1915, if measured by the cost of replacing or reproducing said gas manufacturing plants and distributing systems with new plants of the same kind, capacity and efficiency, or if measured in any proper manner whatever, equal to the sum of \$13,783,000.00, or any sum whatever in excess of \$12,360,981.00; deny that during the year beginning July 1, 1915, it was necessary for plaintiff to make, or that plaintiff did make, additions, extensions or improvements of said plants and systems for the purpose of meeting the demands of the defendant and its inhabitants with gas to the extent of \$321,000.00, or any sum whatever in excess of \$250,000.00; deny that, as
221 the result of any additions, extensions or improvements actually made by plaintiff during the fiscal year 1915-16, the average reproduction value of the property constituting plaintiff's plants and systems during said fiscal year was the sum of \$13,943,000, or any sum whatever in excess of \$12,485,981, making no allowance for accrued depreciation.

VII.

Defendants admit that the duly constituted committee of defendant's Board of Supervisors held divers hearings during the months of February, March, April, May and June, 1915, for the purpose of determining fair and reasonable rates to be charged by plaintiff to the City and County of San Francisco and its inhabitants during the fiscal year 1915-16, for furnishing gas for heating and lighting purposes; admit that at certain of said hearings plaintiff introduced statements verified by oath of its proper officers and oral evidence purporting to set forth the value of its aforesaid property and the necessity of its use; but deny that said statements or oral evidence correctly stated such value or necessity; deny that said statements or oral evidence correctly set forth the cost of manufacturing and distributing gas to the defendant or its inhabitants during the year beginning July 1, 1915, or the amount of gas which was demanded or purchased by the defendant or its inhabitants during said year, or any other facts which would enable said Board to ascertain and determine accurately what would be or constitute a reasonable return or compensation to be paid to plaintiff by the defendant and its inhabitants for gas furnished to them by the plaintiff during said

fiscal year. Defendants admit that thereafter, the City and County of San Francisco, acting by its Board of Supervisors, did enact an ordinance on the 28th day of June, 1915, which was approved by the defendant's Mayor on the 29th day of June, 1915, and became effective on the 1st day of July, 1915, fixing and establishing the quality and illuminating power of gas to be furnished to the defendant and its inhabitants, and fixing the sum of seventy-five (75) cents per thousand cubic feet as the maximum rate and price to be charged for such gas during the year commencing July 1, 1915, and ending June 30, 1916; admit that "Exhibit A," attached to said complaint, is a true and correct copy of the last mentioned ordinance. Defendants admit that plaintiff protested against the adoption of said ordinance on various grounds; but deny that such protest was based upon any facts justifying same, and allege that said protest was based wholly upon the desire of plaintiff to have the Board of Supervisors fix rates which they properly and reasonably considered to be unjustly high, and which would be an unfair and unjust and excessive burden upon the defendant and its inhabitants if permitted to be charged.

VIII.

Defendants deny that the rate of seventy-five (75) cents per thousand cubic feet fixed by said ordinance was not during the year beginning July 1, 1915, or at any time subsequent thereto, a fair and just compensation for gas of the quality and illuminating power described by said ordinance or furnished by plaintiff; deny that said rate was not at all or any times during said fiscal year sufficient to afford plaintiff reasonable and just compensation for the use of plaintiff's aforesaid property, in addition to the actual cost of manufacturing, distributing and selling such gas to the defendant or its inhabitants. In this behalf defendants allege that said rate is and was at all times during said fiscal year 1915-16, wholly just, reasonable and sufficient to afford the plaintiff reasonable and adequate compensation for the use of its aforesaid property and the cost of manufacturing, distributing and selling such gas as aforesaid. Further answering allegations contained in paragraph 15 of said complaint, defendants deny that the revenue received by plaintiff from the conduct of its business during the year beginning July 1, 1915, and ending June 30, 1916, if computed on the basis of the seventy-five (75) cent rate fixed by said ordinance, did not exceed the sum of \$3,840,825.00, but allege that said revenue actually received, if computed on the basis of said rate, was the sum of \$4,005,334.00. Defendants deny that the total amount of expense actually and properly incurred by plaintiff in conducting its said business and in operating its said gas manufacturing plants during said fiscal year, exclusive of the cost of replacements or sums which should have been set aside as reserve funds to cover actual depreciation and probable losses from fire, casualties, obsolescence, inadequacy or contingencies, or all of said sums, was the sum of \$2,425,476.00 or any sum whatever in excess of \$2,271,351.00. De-

defendants deny that a reasonable amount for the plaintiff to have set aside from its revenue during the year beginning July 1, 1915, and ending June 30, 1916, to cover depreciation and probable losses in the conduct of its business, and in the operation of its said plants and systems, resulting from fire, casualties, obsolescence or contingencies during said fiscal year was the sum of \$669,991.00, or any sum whatever in excess of \$525,000.00. Defendants deny that the net income which the plaintiff derived from the use of all its aforesaid property and from the conduct of its aforesaid business of manufacturing, distributing and selling gas to the defendant and its inhabitants for said fiscal year beginning July 1, 1915, did not exceed the sum of \$745,356.00, but allege that said net income exceeded the sum of \$1,208,983.00; deny that said income did not exceed three and sixty-nine hundredths (3.69) per cent of the value of plaintiff's aforesaid property actually and necessarily used by plaintiff in manufacturing, distributing and selling gas to the defendant and its inhabitants during said fiscal year 1915-16, but allege that said net income actually exceeded 13 per cent thereon.

IX.

Answering paragraph 16 of said complaint, defendants deny that the several or any of the items making up the aggregate amounts of the plaintiff's estimated revenue, expenses or reserves for the year beginning July 1, 1915, and ending June 30, 1916, as shown in "Exhibit B" attached to said complaint, are correct, but allege that the actual experience of plaintiff in operating during said fiscal year demonstrates that said estimates were incorrect and erroneous. Defendants deny that the assumptions set forth in paragraph 16 of plaintiff's complaint are correctly made or that, with the exception of the first assumption, that said assumptions are reasonable or proper assumptions to be made, or that they were conservative or supported by facts which should be reasonably and properly considered in making the same. Defendants further allege that said assumptions have been rendered wholly irrelevant and immaterial by the fact that said fiscal year 1914-15 has expired and that it is now possible for plaintiff to inform the court as to the actual income received during said fiscal year under said ordinance rates and the actual and reasonable cost incurred in manufacturing and distributing gas during said fiscal year to the defendant and its inhabitants, and the necessary and proper reserves to be set aside and charged during said fiscal year for depreciation, obsolescence, fire insurance, casualty insurance and any other contingencies.

X.

Answering paragraph 17 of said complaint, defendants admit that a rate of seventy-five (75) cents per thousand cubic feet for gas sold and delivered by plaintiff in the City and County of San Francisco was in effect during the fiscal year beginning July 1, 1912, and ending June 30, 1913, but deny that the statement contained in

"Exhibit C" attached to plaintiff's complaint, purporting to show the gross revenue, expenses and reserves during said fiscal year, are correct, and in this behalf defendants allege that the items of expenses and reserves shown in said exhibit contain many grossly excessive and improper charges against the cost of manufacturing, producing and distributing gas to plaintiff's consumers, of maintaining the plants necessary for the same, and many grossly excessive and improper charges to plaintiff's general administration account, none of which should be properly or equitably borne by plaintiff's rate payers or charged as an operating expense in determining the net revenue actually derived under said ordinance. Defendants make the same allegation with respect to plaintiff's accounts for fire and casualty insurance, and physical and functional depreciation. Further answering said paragraph 17 of plaintiff's complaint, defendants admit that by virtue of the temporary restraining order issued by this Honorable Court plaintiff did ignore the ordinance duly and lawfully adopted by the Board of Supervisors of the City and County of San Francisco fixing a rate of seventy-five (75) cents for the fiscal year 1913-14, and did charge the schedule of rates set forth in paragraph 17 of said complaint, with the exception
226 of certain special rates given by plaintiff to large consumers of gas; but the defendants deny that the actual gross revenue, expenses and reserves for the eleven months beginning July 1, 1913, and ending May 31, 1914, together with the estimated gross revenue, expenses and reserves for the month of June, 1914, are correctly shown in the statement attached to said complaint, marked "Exhibit D," or that the statement also shown in said "Exhibit D" of plaintiff's gross revenue, expenses and reserves on the basis of the seventy-five (75) cent rate, as authorized by ordinance, are correctly stated. In this behalf, defendants again aver that all of the estimates of expenses and reserves shown in said statement, "Exhibit D," are grossly excessive, and contain numerous improper and inequitable charges against the plaintiff's consumers, not having any proper connection with the business of furnishing gas to said consumers or to the City and County of San Francisco. Defendants aver that if said improper charges to expenses and reserves are deducted, that the net return from said seventy-five (75) cent rate, as well as from the schedule of rates actually charged by plaintiff, will be shown to be very much in excess of the net return shown by said exhibits. Defendants admit that the ordinance for the City and County of San Francisco which was in force during the fiscal year beginning July 1, 1914, fixing the rate of seventy-five (75) cents per thousand cubic feet as the maximum price to be charged for gas, was enjoined during said fiscal year by a temporary injunction issued by this Honorable Court, and that during said fiscal year plaintiff charged for gas sold and delivered to the inhabitants of the City and County of San Francisco the schedule of rates which was adopted by the plaintiff, set forth in paragraph 17, subdivision 2, of plaintiff's complaint, with the exception noted in said paragraph. Defendants
227 deny, however, that plaintiff's actual gross revenue, expenses and reserves for the eleven months beginning July 1, 1914,

and ending May 31, 1915, and its estimated gross revenue, expenses and reserves for the month of June, 1915, are correctly shown in statement attached, marked "Exhibit E"; deny that said "Exhibit E" correctly shows what would have been plaintiff's gross revenue, expenses and reserves had it charged for gas sold to the inhabitants of the City and County of San Francisco, during the fiscal year 1914-15, at the rate of seventy-five (75) cents per thousand cubic feet. In this behalf defendants allege that plaintiff's gross revenue during said fiscal year was in excess of the sum charged in "Exhibit E," and that its expenses and reserves properly chargeable to its gas business in the City and County of San Francisco were very much less than the sums set forth in said "Exhibit E"; that the figures set forth in "Exhibit E" for expenses and reserves include many items of grossly inequitable and improper charges against plaintiff's gas business in the City and County of San Francisco, and against plaintiff's gas consumers in said City and County of San Francisco. Defendants further allege that the net revenue shown in said "Exhibit E" as resulting under both the ordinance rates and the rates actually charged for said fiscal year, was very much in excess of the sums set forth in said exhibit, and wholly adequate and sufficient return to plaintiff for said gas service.

XI.

Answering paragraph 18 of plaintiff's complaint, defendants deny that plaintiff's properties used and useful during the fiscal year 1915-16 in furnishing gas to the City and County of San Francisco and its inhabitants are of the character or value set forth in said paragraph 18, and in this behalf defendants allege that the value of such property does not exceed the following sums, to-wit:

a. Lands of the value of.....	\$890,141.62
b. Gas manufacturing plants and distributing system	8,301,165.49
c. Working capital	150,000.00
d. Franchise,—no monetary value whatever.	
e. Going concern, established business and good will as alleged,—all included and accounted for in total valuation of the plant here given, but no separate allowance made.	

Total	\$9,341,307.11
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Defendants further allege that there is no justification either in law or fact for the inclusion of a separate valuation for plaintiff's alleged franchise, or for the alleged elements of going concern, established business and good will. Defendants allege that none of these items have any value whatever separate and apart from the valuation of plaintiff's plant as hereinabove set forth.

XII.

Answering paragraph 19 of plaintiff's complaint, defendants deny that the sum of \$48,069.32, as therein alleged, does not exceed the cost to the plaintiff during said fiscal year to insure at the rate then prevailing in San Francisco in responsible fire insurance companies against loss and damage by fire, such of its property as was subject to destruction or damage by fire, but allege that said sum is very greatly in excess of the actual requirements of plaintiff during said fiscal year for an insurance reserve, and that the sum of \$10,000 is and was wholly reasonable and adequate for the purpose of such insurance during said fiscal year.

XIII.

229 Defendants deny that the item of \$13,969.62, as alleged in paragraph 20 of said complaint, did not very greatly exceed what it would cost or did cost plaintiff during said fiscal year 1915-16 to insure at the rates then prevailing in San Francisco in responsible casualty insurance companies against liability to its employees and the public for personal injuries, but allege that said sum is very greatly in excess of plaintiff's requirements for such purposes, and that the sum of \$15,000.00 is and was wholly adequate, reasonable and proper as a reserve for such casualty insurance during the said fiscal year.

XIV.

Answering paragraph 21 of said complaint, defendants deny that the average annual rate of depreciation of said plants and systems resulting from use, wear and the action of the elements, is 2.86 per cent of the reproduction value of said entire gas manufacturing plants and distributing systems, or that the item of \$398,794.90, shown in "Exhibit B" attached to said complaint as a reserve for depreciation is, as a matter of fact, 2.86 per cent of the fair average reproduction value of the property which constituted said gas manufacturing plants and distributing systems during the year beginning July 1, 1915, or that said sum is a reasonable or conservative or proper amount for the plaintiff to reserve annually from its revenue as a fund for the replacement from time to time of its said plants and systems as the same wear out or are destroyed by ordinary action of the elements. Defendants further deny that the sum of \$209,158.01 alleged in paragraph 22 of said complaint and in "Exhibit A" attached thereto is a reasonable or proper amount to set aside as a fund to cover probable losses resulting from obsolescence of parts of its said plants, inadequacy or contingencies, or to cover probable losses resulting from inevitable accident, extraordinary action of the elements, such as violent storms of wind and rain and earthquake, and losses caused by acts of violence, riots and war, or that the sum amounts to only 1.5 per cent of the average reproduction value of the property constituting

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said gas manufacturing plants and distributing systems during the year beginning July 1, 1915; deny that it is reasonable or proper or necessary for plaintiff to carry any reserve whatever to cover possible losses from accident, extraordinary action of the elements, such as violent storms of wind and rain and earthquake, and losses caused by acts of violence, riots and war, but allege that all of said contingencies are purely speculative and hypothetical, and, if they constitute any element of risk at all, are elements which are incidental to the operation of any business, and a part of the Lazard covered by the rate of return received therefrom; that, moreover, said items are incapable of reasonably accurate estimation or computation and are of such unusual and infrequent occurrence as to be negligible factors in determining the fairness or sufficiency of the ordinance rates in question. Further answering paragraphs 21 and 22 of said complaint, defendants allege that the percentage of 4 per cent of the reproduction value of the depreciable property figured on a straight line basis, equivalent to the sum of \$500,000 for the fiscal year 1915-16 is a wholly sufficient, adequate and proper percentage and a wholly sufficient, adequate and proper amount to be set aside from plaintiff's earnings for said fiscal year as a reserve to cover depreciation, obsolescence, inadequacy and contingencies capable of estimation accruing to, or resulting from, the operation of plaintiff's said gas plant and properties during the said fiscal year.

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XV.

Answering paragraph 23 of said complaint, defendants deny that from time to time said plants or systems have been or will hereafter be damaged or parts thereof destroyed by fire, inevitable accident, extraordinary action of the elements and acts of violence; deny that only a portion of said loss and damage can be remedied by ordinary current repairs or replacements from time to time out of plaintiff's current revenues, or that the residue thereof has to be remedied by periodical replacement of appliances, apparatus and structures which have become useless, inefficient, or have been destroyed. Defendants deny that in order that the plaintiff may maintain its said plants and systems in their integrity and in a condition to render adequate and efficient service to the defendant and its inhabitants, that the plaintiff should set aside annually out of its revenue a sufficient sum to provide not only for current repairs, but also for such hypothetical replacements. Defendants deny that plaintiff has kept all the parts of its aforesaid plants and systems in good condition or repair, but allege in particular that plaintiff's gas distributing system has been and was at all times during said fiscal year 1915-16 in such poor state of repair that a very large percentage of gas leakage resulted, with consequent waste and expense to the plaintiff and plaintiff's gas consumers. Defendants admit that plaintiff's plants and systems were during said fiscal year adequate for supplying the demand of defendant and its inhabitants with gas; but allege that many items of said system were not efficient items, that they were needless duplications, and wastefully operated as the result of buy-

ing out the plaintiff's competitors of the previous years. Defendants therefore deny that said plants and systems have been
232 constructed or maintained prudently or economically. Defendants deny that plaintiff has a right, as alleged, to charge and collect for all gas furnished or sold by it to defendant and its inhabitants such compensation as will enable plaintiff not only to pay the expenses annually incurred by it in manufacturing and distributing gas, but also to set aside from its revenue and maintain reserve funds sufficient to provide for losses occasioned by wear and ordinary action of the elements, and contingencies or probable losses occasioned by fire, casualties, obsolescence, inadequacy, inevitable accident, extraordinary action of the elements, acts of violence, riots and war, and in addition thereto a reasonable annual return or profit upon the capital invested by the plaintiff in said plants, systems and business. In this behalf defendants deny that it is plaintiff's right to collect any rates whatever in excess of those determined by lawful authority to be reasonable, adequate and sufficient to compensate plaintiff for its actual proper cost of manufacturing and distributing gas, including ordinary depreciation and insurance reserves and a reasonable annual return upon capital used and useful and necessary in furnishing gas for heating and lighting purposes to defendant and its inhabitants. Defendants further deny that refusal to allow plaintiff to set up reserves for the purely speculative and hypothetical contingencies alleged in paragraph 25 of said complaint amounts to the taking of the use of plaintiff's entire invested capital without paying due compensation therefor.

XVI.

Defendants admit the propriety of allowing plaintiff a reasonable and adequate reserve for casualty insurance, and allege that the sum of \$15,000 as aforesaid, is wholly adequate, reasonable and sufficient
233 for such purpose. Answering paragraph 26 of said complaint, defendants deny that ever since plaintiff acquired aforesaid gas manufacturing plants and distributing systems that plaintiff has conducted, or is now conducting, its business of manufacturing, distributing and selling gas to the defendant and its inhabitants economically or prudently, or has maintained or is now maintaining its said plants and systems prudently or economically. In this behalf defendants allege that many of plaintiff's expenses of operation, and in particular its general administration expenses, have been and were during the fiscal year 1915-16 grossly in excess of the amounts which should have been charged under prudent and economical management; that its reserves have been grossly over estimated and are very grossly in excess of plaintiff's experienced requirements during said fiscal years previous and subsequent thereto, and that as the result of such grossly excessive operating expenses and reserves, any assumptions which are based thereon are and were excessive and unreliable.

XVII.

Defendants deny that during the year 1914-15, or during the year 1915-16, it was necessary for plaintiff to pay a rate of interest of as much as 6.5 per cent. per year for money borrowed on security of its aforesaid property, but allege that money could be secured during both of said fiscal years upon much more favorable terms by corporations having monopoly and security of investment which characterized the investment of plaintiff in its San Francisco gas business during said years. Defendants deny that it was necessary for plaintiff or any other corporation, as hypothetically suggested, to earn a net profit of at least one and one-half times the entire amount of interest payable upon amounts of money borrowed upon
 234 such security; deny that during said fiscal year 1915-16 that the prevailing rate of interest in said City and County of San Francisco for money loaned upon good real estate security at an amount not exceeding 60 per cent. of the value thereof was, or has at any time since, been not less than 6 per cent. net, the borrower paying all taxes and other charges. In this behalf defendants allege that very large sums of money were borrowed upon good real estate security during said fiscal year, and since then at rates of interest not greater than 5 per cent. in the City and County of San Francisco.

XVIII.

Answering paragraph 28 of said complaint, defendants deny that a net profit of 8.5 per cent per year upon the value of plaintiff's aforesaid property after paying all actual expenses of manufacturing, distributing and selling gas, and after making reasonable provision for depreciation and contingent and probable losses resulting from fire, casualties, obsolescence, inevitable accident, acts of violence, riots and war, is the minimum profit that will be reasonable compensation for the use of plaintiff's aforesaid property for the service rendered by plaintiff in conducting its said business under the then existing conditions. In this behalf defendants allege that the minimum profit of 5 per cent. after making reasonable provision and allowance for operating expenses, depreciation and insurance reserves is reasonable and non-confiscatory compensation for the use of plaintiff's aforesaid property and for the service rendered by the plaintiff in conducting its said business under the conditions existing during the fiscal year 1915-16 aforesaid. Defendants deny that under said existing conditions that an ordinance or governmental act fixing rates to be charged by plaintiff for gas to be manufactured, distributed and sold by it to defendant and its inhabitants which
 235 did not permit the plaintiff to earn by the use of its aforesaid plants and systems and property and from the conduct of its business a net profit of at least 8.5 per cent per year upon the value of such plants, systems and property, over and above operation expense and reserve above indicated, or yield any percentage or profit greater than 5 per cent, upon such value, after making such deduc-

tions and allowance, will operate to deny to the plaintiff the equal protection of the laws, or will deprive the plaintiff of its property, or of the use thereof without just compensation or without due process of law, or in violation of the fourteenth amendment of the Constitution of the United States of America.

XIX.

Answering paragraph 29 of said complaint, defendants deny that illuminating and fuel gas of the quality prescribed by the aforesaid ordinance has been at all times in said complaint mentioned, or now is, reasonably worth to the consumers thereof in said City and County of San Francisco the price set forth in the schedule of rates alleged, in paragraph 17 of said complaint, to have been charged by plaintiff, or that said rates set forth in said schedule are the lowest rates that will afford to plaintiff just or reasonable compensation for the gas furnished by it in said City and County of San Francisco, or that they are too low to afford to plaintiff reasonable compensation for the use of its aforesaid property. Defendants deny that the value of said service of supplying gas of said prescribed quality to consumers thereof in said City and County of San Francisco is greater than the rates fixed by ordinance of the Board of Supervisors, annexed to said complaint as "Exhibit A," and allege that said rates are more than sufficient to furnish plaintiff a just and reasonable compensation for the gas furnished by it and for the use of
236 its aforesaid property during said fiscal year. Defendants deny that said ordinance fixing the maximum price at seventy-five (75) cents per thousand cubic feet, deprives the plaintiff of the equal protection of the laws, or if enforced will deprive the plaintiff of its property without just compensation and without due process of law, or is in violation of the fourteenth amendment to the Constitution of the United States of America.

XX.

Answering paragraph 30 of said complaint, defendants admit that said ordinance for the year beginning July 1, 1915, and fixing a maximum rate of seventy-five (75) cents per thousand cubic feet for gas was not enforced during said fiscal year, by reason of a temporary restraining order issued by this Honorable Court, but deny that said ordinance if enforced would have deprived the plaintiff of its property without just or reasonable compensation and without due process of law, or denied to the plaintiff the equal protection of the laws, or that said ordinance would have been repugnant to it or in violation of the fourteenth amendment to the Constitution of the United States of America, or that it would have been therefor null and void.

XXI.

Defendants allege that the allegations of paragraphs 31 and 32 are wholly irrelevant and immaterial, inasmuch as the fiscal year

1915-16 is now past, and said ordinance was not enforced during said year by reason of the temporary restraining order issued by this Honorable Court. Answering paragraph 33 of said complaint, defendants deny that the plaintiff has no remedy except in equity for a complete determination of the invalidity of the said ordinance, or for the protection of plaintiff from the alleged deprivation or
237 alleged denial of plaintiff's right to the equal protection of the laws by the enforcement of said ordinance. Defendants further deny that in the absence of the remedy of injunction afforded by courts of equity, said ordinance would be enforced in violation of the provisions of the fourteenth amendment of the Constitution of the United States, or of any other or all Constitution provisions, and deny the jurisdiction of this court to protect it from such alleged deprivations, because said deprivations did not as a matter of fact exist.

XXII.

Defendants admit that the matter in dispute exceeds, exclusive of interest and cost, the sum or value of three thousand dollars (\$3,000.00).

XXIII.

Answering paragraph 35 of said complaint, defendants aver that the allegations therein are now irrelevant and immaterial by reason of the fact that the fiscal year in question, being the fiscal year 1915-16, is now past, and the ordinance in question was, as a matter of fact, during said fiscal year enjoined by the restraining order of this Court; but defendants deny that the balance of equities was or is in favor of the defendant; deny that the right of plaintiff to collect compensation in excess of that lawfully established by the ordinance in question is greater than the right to each of the 100,000 alleged consumers of plaintiff to receive gas service at rates not in excess of those established by such ordinance; allege that the excessive rates which have been collected by plaintiff under permission of the said restraining order heretofore granted has worked great and irreparable injustice upon a very large number of plaintiff's said consumers; that many of said consumers have moved away, and
238 that it is improbable that the amounts which they have paid plaintiff in excess of those lawfully established by such ordinance will ever be returned to them. Defendants allege that the proportion which said excess charges paid by each consumer bears to his total monthly income and monthly expenses is much greater relatively than the gross amount thereof is to the monthly expenses and monthly income of plaintiff. Defendants allege that plaintiff has collected and retained and has been enjoying the use of such excess sums for more than a year last passed, and that such collection has amounted to the deprivation of the property of plaintiff's consumers, and the imposition of an excessive and inequitable burden upon the same.

Wherefore defendants pray that plaintiff take nothing further by this suit in equity; that it be adjudged and decreed that the aforesaid ordinance is valid and that the rates therein prescribed are reasonable, non-confiscatory and adequate rates to be charged by plaintiff during the fiscal year 1915-16 for furnishing gas to the City and County of San Francisco and its inhabitants; that plaintiff be required to forthwith return to each of its consumers, in accordance with the order of this court, all sums collected from said consumers during said fiscal year in excess of those which should have been charged under the said ordinance rates, together with interest thereon at legal rates from the date of each such collection; that defendants may have their costs in this proceeding incurred; and for such other equitable relief as to the court may seem meet and proper in the premises.

PERCY V. LONG,

City Attorney;

ROBERT M. SEARLS,

Assistant City Attorney,

Solicitors for Defendants.

239 UNITED STATES OF AMERICA,
Northern District of California,
City and County of San Francisco, ss:

James Rolph, Jr., being first duly sworn, deposes and says: That he is the duly elected and qualified Mayor of the City and County of San Francisco, named as defendant in the above entitled action; that the foregoing answer and all and singular the allegations therein contained are true of his own knowledge, except as to the matters therein stated to be alleged upon information and belief, and that as to those matters he believes it to be true; and that he makes this affidavit on behalf of said defendant.

JAMES ROLPH, JR.

Subscribed and sworn to before me, this 13th day of Dec. 1916.

A. J. NAGLE, [SEAL.]

*Notary Public of the State of California in
and for the City and County of San Francisco.*

Service by copy of within original is hereby admitted this 14th day of December, 1916.

WM. B. BOSLEY,

Solicitor for Plaintiff.

Endorsed: Filed Dec. 15, 1916. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

- 240 At a stated term, to wit: the March term, A. D. 1921, of the Southern Division of the United States District Court for the Northern District of California, Second Division, held at the Court Room in the City and County of San Francisco, on Monday, the 6th day of June, in the year of our Lord one thousand nine hundred and twenty-one.

Present: The Honorable William C. Van Fleet, District Judge.

Equity.

No. 190.

PACIFIC GAS & ELECTRIC CO.

vs.

CITY AND COUNTY OF SAN FRANCISCO et al.

(Order Overruling Exceptions to Master's Report, etc.).

The exceptions of plaintiff and the exceptions of defendants, to the Master's report, heretofore submitted, being now fully considered and the opinion of Judge Rudkin being filed, it is ordered, in accordance with said opinion, that the exceptions to the report be overruled and that the report stand confirmed and that a decree be entered in accordance with said report.

- 241 In the Southern Division of the United States District Court for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

Decree.

This cause having been referred on the 15th day of December, 1916, to the Honorable H. M. Wright, Standing Master in Chancery of the above entitled Court, for hearing, and the said Master having filed herein on the 2d day of March, 1920, his report thereon, and each of the parties herein having duly filed exceptions to said report, and said exceptions thereto coming on regularly for hearing in this Court on the 1st day of June, 1920, and the matter having been duly presented and argued by the parties and submitted to the Court on briefs for its consideration and decision, and the Court having duly

considered the same and having on the 6th day of June, 1921, rendered its opinion and decision overruling plaintiff's exceptions to said report and confirming said report as filed, and the Court having ordered that a decree should be entered in accordance with the conclusions set forth in said opinion,

Now, therefore, in accordance with such order,

It is hereby ordered, adjudged and decreed that the said
242 report of said Master H. M. Wright, filed herein on the 2d day of March, 1920, be and it is hereby confirmed, and that all exceptions of the complainant to said report are hereby overruled. The Court finds it unnecessary to pass upon the exceptions of defendants.

It is hereby further ordered, adjudged and decreed that the ordinance of the Board of Supervisors of the City and County of San Francisco, passed on the 28th day of June, 1915, numbered Ordinance 3388, New Series, and set forth as Exhibit "A" to the complaint herein, and purporting to fix maximum rates to be charged for gas furnished to the City and County of San Francisco and its inhabitants during the fiscal year beginning July 1, 1915, and ending June 30, 1916, and the rates fixed by said ordinance afforded just and due compensation to complainant, are not a violation of the Fourteenth Amendment to the Constitution of the United States, and are reasonable and valid.

It is further ordered, adjudged and decreed that the preliminary restraining order heretofore granted in this case and all orders modifying the same be and they are hereby dissolved; that the plaintiff is hereby ordered and directed, within nine (9) calendar months from and after the date of entry of this decree, to return to each of its consumers from whom it has collected any sum or sums of money in excess of the amounts which were properly chargeable at the rates fixed in said Ordinance No. 3388, New Series, for gas supplied to consumers from June 30, 1915, to and including October 28, 1917, all of the excess sums so collected, together with interest thereon, to be computed as follows, viz.: interest at seven (7) per cent. per annum on such excess sums from the respective dates of their collection to the date of entry of this decree, and also interest at seven (7) per cent. per annum on the total amount of said excess
243 sums plus the interest so computed thereon, from the date of entry of this decree until the date at which said sums shall have been paid over to such consumers or to the Special Master of the Court for distribution as hereinafter provided, pursuant to the provisions of this decree; provided, that in order to minimize the labor and expense of computing the interest payable hereunder, methods of computation may be adopted involving the use of approximate averages of principal sums and of periods of time for which interest is payable which, in the opinion of the Special Master, will give substantially accurate results; provided, moreover, that the complainant may, and it is hereby authorized to deduct from the amount which is otherwise to be payable to any consumers under the terms of this decree, such sum or sums of money as may be due from such consumers to the complainant; provided, further, that

prior to paying such amounts plaintiff may deduct therefrom such expenses as the Court has heretofore specified or may hereafter specify by order as a proper charge against said excess collections; and that the plaintiff at or before the expiration of said period of nine (9) months shall make a return to the Special Master hereinafter appointed by this Court, showing its compliance with this decree, together with the necessary books and vouchers supporting the same, and plaintiff shall pay to said Special Master at the time of making said return all of the unpaid balance which may be due to consumers under the provisions of this decree at the date of said return.

Said Special Master shall thereafter have sole and exclusive charge of locating the consumers entitled to such unpaid balance, or their legal representatives, and is hereby authorized and directed to pay to such consumers or their legal representatives when so located by him, the respective excess amounts due to them under the terms of this decree, out of the funds so deposited with him by
244 plaintiff. In order to facilitate the work of said Special Master, at the time of depositing said excess amounts for the account of said consumers who have not been paid, the plaintiff shall deliver to said Special Master books or statements showing the names and last known addresses of said consumers who have not been paid and the exact amount of principal and interest due to each of said consumers. If the Special Master shall be unable to locate any of the consumers to whom such payments are due or their legal representatives, he shall hold the amounts respectively due to such consumers subject to the further order of the Court.

It is further ordered, adjudged and decreed that for the purpose of assuring compliance with the provisions of this decree, Walter B. Maling, Clerk of this Court, is hereby constituted and appointed as Special Master of this Court, with full authority and duty to supervise the execution of the provisions of this decree under the direction of the Court, and is thus selected as Special Master for the reason that the claims to the fund will be extremely numerous, and their identity and the amount of their claims will have to be established by incessant reference to the books of complainant and the records of the Court, and such books and records can be most expeditiously and economically consulted by a Special Master, who is an officer of this Court. The expenses of said Special Master shall be hereafter fixed by the Court and shall be a charge against the funds in his hands, to be apportioned as the Court may hereafter direct. The Court hereby expressly retains jurisdiction of the subject matter of this litigation for the purpose of regulating the execution of the terms and conditions of this decree.

It is further ordered, adjudged and decreed that the defendants have and recover of and from the plaintiff their costs expended and incurred in this suit, taxed at \$652.37.

245 Dated: June 28, 1921.

(Sgd.)

FRANK H. RUDKIN,
District Judge.

Endorsed: Filed and entered July 6, 1921, Walter B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

246 In the Southern Division of the District Court of the United States, in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,
vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Petition for Appeal to the Supreme Court of the United States.

To Honorable William C. Van Fleet, District Judge:

Pacific Gas and Electric Company, the plaintiff above named, conceiving itself to be aggrieved by the final decree made in the above entitled cause and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 7, does hereby appeal from said decree to the Supreme Court of the United States for the reasons specified in the assignment of errors which is filed herewith, and prays that its appeal be allowed, that citation be issued as provided by law, and that a transcript of the record, proceedings and papers upon which said decree was based be duly authenticated and sent to the Supreme Court of the United States sitting at Washington in the District of Columbia.

247 Said plaintiff, desiring that said decree be superseded and that the execution thereof be stayed pending the determination of its appeal therefrom, tenders its bond with sureties in such amount as may be required for that purpose, and prays that a proper order be made by you fixing the amount of such bond and directing that, upon the filing and approval of such bond, said decree be superseded and the execution thereof be stayed.

WM. B. BOSLEY,
Solicitor for Plaintiff.

248 In the Southern Division of the District Court of the United States, in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Order Allowing Appeal and Fixing Amount of Bond.

On motion of William B. Bosley, solicitor for plaintiff, It is hereby ordered as follows:

1. That the foregoing and annexed petition be granted and that plaintiff's appeal to the Supreme Court of the United States from the final decree mentioned in said petition be and the same is hereby allowed;

2. That a transcript of the record, proceedings, testimony, exhibits and papers upon which said decree was made be duly authenticated and transmitted to the Supreme Court of the United States;

3. That the amount of the bond on appeal to be filed by the plaintiff herein, the same to serve as a bond for costs and damages on appeal and also as a supersedeas bond, be fixed at the sum of
249 one million two hundred and fifty thousand dollars (\$1,250,000.00), and that such bond be executed by the plaintiff and good and sufficient sureties; and

4. That, upon the filing and approval of such bond, said final decree shall be superseded and the execution thereof shall be stayed pending said appeal.

Done in open court this 13th day of September, 1921.

WM. C. VAN FLEET,
District Judge.

Endorsed: Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

- 250 In the Southern Division of the District Court of the United States, in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

VS.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Assignment of Errors and Prayer for Reversal.

Now comes the plaintiff, Pacific Gas and Electric Company, by William B. Bosley, its solicitor, and respectfully says:

(a) That there is manifest error in the record, to-wit, in the Master's report on final hearing, the order confirming said report and the final decree, in the above-entitled suit which was brought by said plaintiff for the purpose of obtaining a decree enjoining and restraining the defendants herein from enforcing a certain ordinance adopted by the Board of Supervisors of defendant City and County of San Francisco which purported to fix, as the maximum rate or price to be charged for gas furnished to said City and County of San Francisco and its inhabitants during the year beginning July 1, 1915 and ending June 30, 1916, or until the fixing of gas rates by the Railroad Commission of California, the sum of seventy-five cents per thousand cubic feet;

251 (b) That the ground upon which said plaintiff sought to enjoin the enforcement of said ordinance in said suit was that said ordinance was void for repugnancy to the Fourteenth Amendment to the Constitution of the United States of America and particularly to those provisions of said amendment which declare that no state shall deprive any person of property without due process of law or deny to any person within its jurisdiction the equal protection of the laws; and

(c) That to said plaintiff the rights secured by the aforesaid provisions of the Fourteenth Amendment and the justice which is its due have been denied by said final decree which confirms the Master's report, adjudges said maximum rate to be just and reasonable and said ordinance to be valid and not repugnant to said provisions of said Fourteenth Amendment, and orders and directs said plaintiff to return, to each of its consumers from whom it collected any amount of money in excess of the amount authorized by said ordinance for gas supplied while said ordinance was in effect, the excess amount so collected together with interest thereon.

And now said plaintiff, appealing from said final decree to the Supreme Court of the United States, prays for the reversal of said decree, and assigns and sets out separately and particularly each error which it asserts and intends to urge as a ground for such reversal, as follows, viz:

1. Said District Court erred in adjudging, in and by said final decree, that the maximum rate for gas, to-wit, seventy-five cents per thousand cubic feet, fixed by said ordinance, afforded just and due compensation to plaintiff, and that said ordinance was reasonable and valid and did not deprive said plaintiff of its property without due process of law nor deny to said plaintiff the equal protection of the laws and was not repugnant to the aforesaid provisions of the Fourteenth Amendment to the Constitution of the United States.

2. Said District Court erred in ordering and adjudging, in and by said final decree, that the preliminary restraining orders theretofore granted in said suit be dissolved, and that plaintiff return, to each of its consumers from whom it had collected any money in excess of the amount authorized by said ordinance for gas supplied during the period commencing July 1, 1915, and ending October 28, 1917, the excess amount so collected together with legal interest thereon.

3. Said District Court erred in confirming in and by said final decree said Master's report, and in overruling in and by said final decree said plaintiff's exceptions to said report, and particularly in overruling the exceptions hereinafter specified.

4. Said District Court erred in overruling plaintiff's fourth exception to the Master's report. A true copy of said fourth exception, as it appears in the plaintiff's "Objections to Draft Report of Standing Master in Chancery on Final Hearing," which, having been overruled by the Master, became exceptions to the Master's final report, by virtue of a stipulation made pursuant to rule of court, is as follows:

"Objection No. 4. Plaintiff objects to the mixed finding of fact and conclusion of law, as shown on pages 27 to 31 of said draft report, that the sum of \$612,931.61, being a part of the estimated cost of cutting and relaying existing pavement included in the reproduction cost of plaintiff's gas distribution system in the City and County of San Francisco should be deducted and excluded from the reproduction cost of plaintiff's aforesaid structural property, because said sum of \$612,931.61 represents the estimated cost of cutting and relaying over gas mains and pipes certain pavement which is not shown by the evidence to have been laid before the laying of the gas mains and pipes now covered thereby and which consequently is not shown to have entered into the actual historical cost of plaintiff's existing gas distribution system."

5. Said District Court erred in overruling plaintiff's sixth exception to the Master's report. A true copy of said sixth exception, as

it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 6. Plaintiff objects to the mixed finding of fact and conclusion of law implied in the statement in the second paragraph of page 75 of said draft report, viz: 'Accordingly, I shall determine the present value of plaintiff's plant and the reasonable annual allowance to reserve by the modified sinking fund method, including in the factors which have influenced the existing depreciation—the reserves which ought to be on hand—the effects of obsolescence and inadequacy as well as of physical deterioration.' The

finding so implied is, in effect, that it is just and equitable
254 to determine the present value of plaintiff's aforesaid structural property and the reasonable annual allowances to be made to the plaintiff for accruing depreciation of such property caused by wear, physical deterioration, inadequacy and obsolescence all combined, by the application of the so-called Modified Sinking Fund Method as distinguished from the pure Sinking Fund Method."

The principal grounds of said sixth exception which are set forth in plaintiff's said objections are as follows:

"(b) This implied finding fails to make the natural and necessary distinction between (1) depreciation caused by gradual wear and gradual physical deterioration resulting from use and the known action of the elements, and (2) depreciation which results from causes fortuitous in their nature which include new inventions and discoveries resulting in obsolescence and changes in population and business resulting in inadequacy."

"(c) This implied finding, so far at least as it applies to the determination of the present value of plaintiff's structural property, is in conflict with the uncontradicted testimony of Mr. E. C. Jones with respect to the nature, use and present condition of by far the major part of plaintiff's aforesaid structural property."

6. Said District Court erred in overruling plaintiff's seventh exception to the Master's report. A true copy of said seventh exception, as it appears in plaintiff's said "Objections to Draft Report of
255 Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 7. Plaintiff objects to each of the following findings of fact shown on page 79 of said draft report viz:

(1) The amount of the existing depreciation which ought to be deducted from the average reproduction cost in order to ascertain the present value of plaintiff's said structural property was, for the year 1913-14, the sum of \$1,518,390.00, for the year 1914-15, \$1,780,411.00, and for the year 1915-16, \$1,493,162.00; and

(2) The proper annual allowance for accruing depreciation of plaintiff's said structural property was for the year 1913-14 the sum

of \$348,853.00, for the year 1914-15 the sum of \$372,680.00, and for the year 1915-16, the sum of \$380,519.00."

7. Said District Court erred in overruling plaintiff's eighth exception to the Master's report. A true copy of said eighth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 8. Plaintiff objects to the Master's failure to find the present value of plaintiff's patent rights which are described and discussed on pages 84 to 87 of said draft report and his failure to include such value in his subsequent finding as to the present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants during the period beginning July 1, 1913, and ending June 30, 1916."

256 8. Said District Court erred in overruling plaintiff's ninth exception to the Master's report. A true copy of said ninth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 9. Plaintiff objects to the Master's failure to find that plaintiff is legally and equitably entitled to the savings in the manufacture of gas effected by its use of the apparatus and process invented by E. C. Jones and Leon B. Jones and protected by the patents described on page 84 of said draft report, in addition to a reasonable return upon its property necessarily and properly used in supplying gas to said City and County of San Francisco and its inhabitants exclusive of said patent rights."

9. Said District Court erred in overruling plaintiff's tenth exception to the Master's report. A true copy of said tenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 10. Plaintiff objects to the Master's finding shown on page 86 of said draft report to the effect that the savings attributed by the plaintiff to the use of the aforesaid patented apparatus and process were due in part to economies incident to the production of larger quantities of gas."

10. Said District Court erred in overruling plaintiff's eleventh exception to the Master's report. A true copy of said eleventh exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

257 "Objection No. 11. Plaintiff objects to the Master's finding of fact set forth on page 95 of said draft report to the effect that, during the entire period from July 1, 1913, to June 30, 1916, the additional value of plaintiff's property used and useful in supplying gas to the City and County of San Francisco and its inhabitants when viewed as a going concern and in connection with the established business conducted by means thereof was the sum of \$1,500,000.00 and no more."

The principal grounds of said eleventh exception which are set forth in plaintiff's said objections are as follows:

"(a) Said finding with respect to 'going value' is not sustained by the evidence.

(b) The uncontradicted evidence introduced by plaintiff justifies and indeed compels the conclusion that the so-called 'going value' of plaintiff's aforesaid property was, during the entire period from July 1, 1913, to June 30, 1916, not less than the sum of \$3,000,000.00.

(c) The aforesaid finding with respect to 'going value' is essentially arbitrary because it is not supported by the evidence, but, on the contrary, clearly appears by the statement made on page 95 of said draft report to have been made in deference to what the Master conceived to be the meaning and effect of the opinion of Hon. Frank H. Rudkin rendered in passing upon the Master's report in the case of Spring Valley Water Company v. City and County of San Francisco, 252 Fed. 979, 985-6."

258 11. Said District Court erred in overruling plaintiff's twelfth exception to the Master's report. A true copy of said twelfth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 12. Plaintiff objects to the mixed finding of fact and conclusion of law shown in the last paragraph on page 98 of said draft report, 'that plaintiff's franchise has no separate or additional value beyond the sum of the values of its physical property, together with its going value already recognized in the foregoing appraisalment'."

12. Said District Court erred in overruling plaintiff's thirteenth exception to the Master's report. A true copy of said thirteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 13. Plaintiff objects to the Master's finding of fact with respect to the total value of plaintiff's used and useful gas property in San Francisco and the findings with respect to the items designated as 'structures' and 'going value,' set forth on page 101 of said draft report; and also objects to his failure to include in the total value of said property the reasonable value of its aforesaid patent right and franchise."

13. Said District Court erred in overruling plaintiff's fourteenth exception to the Master's report. A true copy of said fourteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

259 "Objection No. 14. Plaintiff objects to the Master's mixed finding of fact and conclusion of law that plaintiff is not en-

titled to receive, in addition to the cost of operation and maintenance and a reasonable return upon the value of its property used and useful in supplying gas to its consumers in said City and County of San Francisco, a reasonable compensation for the service which it renders through the agency of its board of directors to its consumers by creating and maintaining an efficient organization of experienced men, by establishing a credit which enables it to obtain capital on favorable terms and by intelligently and efficiently directing and supervising such organization and the general conduct of its business whereby the service rendered to consumers is improved and economies are effected which normally result in the gradual reduction of cost of service to its consumers."

14. Said District Court erred in overruling plaintiff's fifteenth exception to the Master's report. A true copy of said fifteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 15. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of ten thousand dollars (\$10,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of fire insurance."

15. Said District Court erred in overruling plaintiff's sixteenth exception to the Master's report. A true copy of said sixteenth exception, as it appears in plaintiff's said "Objections to Draft
260 Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 16. Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of fifteen thousand dollars (\$15,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of insurance against liability for personal injuries resulting from casualties."

16. Said District Court erred in overruling plaintiff's seventeenth exception to the Master's report. A true copy of said seventeenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 17. Plaintiff objects to the finding of fact that plaintiff is not entitled to any separate allowance in lieu of the cost of insuring its automobiles."

17. Said District Court erred in overruling plaintiff's nineteenth exception to the Master's report. A true copy of said nineteenth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 19. Plaintiff objects to the finding of fact set forth on page 111 of said draft report that the 'minimum fair rate of return that plaintiff was entitled to earn' upon the present value of its prop-

erty used and useful in furnishing gas to the City and County of San Francisco and its inhabitants 'was seven per cent a year.' "

18. Said District Court erred in overruling plaintiff's twentieth exception to the Master's report. A true copy of said twentieth
261 exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

T "Objection No. 20. Plaintiff objects to the summaries and conclusions shown on pages 129 and 130 of said draft report to the extent that they embrace and involve the errors to which the foregoing objections Nos. 1 to 19 inclusive are directed upon the grounds hereinbefore set forth. With reference to the 'Ordinance Revenue' shown on page 130, plaintiff directs the Master's attention to the fact that plaintiff in its Exhibit No. 108 concedes that additions to its gross revenue as brought forward from Exhibit No. 38 should be made as follows, viz:

(1) For the year 1913-14 the sum of \$8,650.45, making the corrected gross revenue the sum of \$3,414,182.96;

(2) For the year 1914-15 the sum of \$6,151.53, making the corrected gross revenue the sum of \$3,641,213.06; and

(3) For the year 1915-16 the sum of \$16,881.18, is making the corrected gross revenue the sum of \$3,801,565.03."

19. Said District Court erred in overruling plaintiff's twenty-first exception to the Master's report. A true copy of said twenty-first exception as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing," is as follows:

"Objection No. 21. Plaintiff objects to the Master's conclusion of law expressed on pages 130 to 134 of said draft report that the fact that the natural and necessary effect of the aforesaid ordinances, if enforced, was to compel plaintiff to furnish gas to a large number
262 of consumers, to-wit, approximately twenty thousand, in each of the three years from July 1, 1913, to June 30, 1916, at less than actual cost exclusive of any return on capital, the loss thence arising exceeding \$22,000.00 per year, is immaterial in the determination of the issue as to the reasonableness of the rates prescribed by, and the constitutionality of, said ordinances."

20. Said District Court erred in overruling plaintiff's twenty-third exception to the Master's report. A true copy of said twenty-third exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 23. Plaintiff objects to the Master's conclusion that the ordinances of the Board of Supervisors of the City and County of San Francisco fixing maximum rates for gas for the three years from July 1, 1913, to June 30, 1916, if they had been enforced,

would have afforded plaintiff a fair return on the fair present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants."

21. Said District Court erred in overruling plaintiff's twenty-fourth exception to the Master's report. A true copy of said twenty-fourth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 24. Plaintiff objects to the Master's conclusion that the aforesaid ordinances provided a fair and just compensation for supplying gas to said City and County and its inhabitants and were valid under the Constitution of the United States."

263 22. Said District Court erred in overruling plaintiff's twenty-fifth exception to the Master's report. A true copy of said twenty-fifth exception, as it appears in plaintiff's said "Objections to Draft Report of Standing Master in Chancery on Final Hearing", is as follows:

"Objection No. 25. Plaintiff objects to the Master's conclusion that the defendant in said suits should have decrees in its favor dismissing the bills of complaint therein with costs to the defendant and with proper provisions for return by plaintiff to the consumers of charges over the rates fixed by said ordinances."

The "Draft Report of Standing Master in Chancery on Final Hearing" was substantially the same as the Master's "Report on Final Hearing", the only changes therein being those noted in the Master's "Supplemental Report" which is attached to and forms a part of said Master's "Report on Final Hearing"; and the references made in the above and foregoing assignments of error and the exceptions mentioned therein to said draft report apply to said report on final hearing, the paging of both being the same.

The above-mentioned Master's Report covers three similar cases designated as cases Nos. 27, 97 and 190 In Equity in the above-entitled court, which were consolidated for trial and referred for hearing to the Standing Master in Chancery. Consequently the plaintiff's exceptions to the Master's Report cover all three cases.

Wherefore, said appellant Pacific Gas and Electric Company prays that the aforesaid final decree in the above-entitled suit be reversed by the Supreme Court of the United States and that such further relief be granted as may be meet and equitable.

WM. B. BOSLEY,
Solicitor for Plaintiff and Appellant.

Endorsed: Filed Sep. 13. 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

- 264 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

Bond on Appeal for all Damages and Costs to Operate as a Superseas.

Know all men by these presents that we, Pacific Gas and Electric Company, a corporation organized under the laws of the State of California and having its office and principal place of business in the City and County of San Francisco, state aforesaid, (being the plaintiff in the above entitled cause), as principal, and J. A. McCandless, Henry E. Bothin, W. E. Creed, F. G. Drum and C. O. G. Miller, as sureties, are held and firmly bound unto City and County of San Francisco, a municipal corporation in the State of California, and James Rolph, Jr., Mayor of said City and County, (being the defendants in the above entitled cause), for the use and benefit of said defendants and for the use and benefit of all other persons to whom any sum of money is payable under and pursuant to the provisions of the decree hereinafter mentioned, according to their respective rights and interests, in the sum of one million two hundred and fifty thousand dollars (\$1,250,000.00) to be paid to said defendants for their own use and benefit and for the use and benefit of said other persons, their respective successors, executors, administrators or assigns, and for the payment of said sum as aforesaid well and truly to be made said principal binds itself and its successors, and said sureties bind themselves and their respective heirs, executors and administrators, jointly and severally, firmly by these presents.

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Whereas in the above entitled cause a final decree was made by the above entitled court and filed and entered in the office of the Clerk thereof on the 6th day of July, 1921; and

Whereas said principal has appealed, in the manner provided by law and the rules of court, from said final decree to the Supreme Court of the United States to reverse said decree:

Now, therefore, the condition of this obligation is such that, if said principal shall prosecute its said appeal to effect and, if it shall fail to make its plea good, shall answer all damages and costs, then this obligation shall be void, but otherwise shall remain in full force and virtue.

Sealed with our seals and dated this 12th day of September, 1921.

PACIFIC GAS AND ELECTRIC COMPANY,

By JOHN A. BRITTON,

Its Vice-President and General Manager.

[Corporate Seal.]

Attest:

D. H. FOOTE,

Its Secretary.

J. A. McCANDLESS.

HENRY E. BOTHIN.

F. G. DRUM.

W. E. CREED.

C. O. G. MILLER.

266 STATE OF CALIFORNIA,

City and County of San Francisco, ss:

On this 12th day of September, in the year 1921, before me, R. J. Cantrell, a notary public of the State of California, in and for said City and County of San Francisco, residing therein and duly commissioned and sworn, personally appeared John A. Britton, known to me to be the vice-president and general manager, and D. H. Foote, known to me to be the secretary, of Pacific Gas and Electric Company, the corporation which is named as principal in the above and foregoing instrument and which executed the same, and acknowledged that said corporation executed said instrument.

In witness whereof I have hereunto set my hand and affixed my official seal in said City and County of San Francisco the day and year in this certificate first above written.

[Notarial Seal.]

R. J. CANTRELL,

*Notary Public of the State of California in
and for the City and County of San Francisco.*

Satisfactory to defendants.

R. M. SEARLS.

267 UNITED STATES OF AMERICA,

Northern Judicial District of California,

State of California,

City and County of San Francisco, ss:

J. A. McCandless, being first duly sworn, deposes and says: That he is a resident and a freeholder in the Southern Division of the Federal Northern Judicial District of California and worth the sum of one million dollars (\$1,000,000.00), exclusive of property exempt from execution and over and above all debts and liabilities; and Henry E. Bothin, F. G. Drum, W. E. Creed and C. O. G. Miller, being first duly sworn, each for himself deposes and says: That he is a resident and a freeholder in the Southern Division of the Fed-

eral Northern Judicial District of California and worth the sum of five hundred thousand dollars (\$500,000.00), exclusive of property exempt from execution and over and above all debts and liabilities; and, further, said J. A. McCandless, Henry E. Bothin, F. G. Drum, W. E. Creed and C. O. G. Miller severally acknowledged that they executed the annexed bond.

J. A. McCANDLESS.
HENRY E. BOTHIN.
F. G. DRUM.
W. E. CREED.
C. O. G. MILLER.

Subscribed and sworn to before me this 13 day of September, 1921.

[SEAL.]

J. A. SCHAEERTZER,
*Deputy Clerk, U. S. District Court,
Northern District of California.*

The within bond is approved Sept. 13, 1921.

WM. C. VAN FLEET,
U. S. Dist. Judge.

Endorsed: Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

268 In the District Court of the United States in and for the Northern District of California, Second Division, Ninth Circuit.

In Equity.

Nos. 27, 97, 190.

PACIFIC GAS & ELECTRIC COMPANY, a Corporation, Complainant,
vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
et al., Defendants.

(*Stipulation Consolidating Cases for Trial.*)

Whereas, the above entitled and numbered causes are suits in equity involving the validity of gas rate ordinances passed by the Board of Supervisors of the City and County of San Francisco for the fiscal years 1913-14, 1914-15 and 1915-16 respectively; and

Whereas the same, or nearly the same issues are involved in each of said causes; and

Whereas said causes are proper matters for reference to the standing master in chancery of this court;

Now therefore, it is hereby stipulated that an order may be made consolidating the above entitled cases for trial and that the same

may then be referred for hearing to the standing master in chancery.

WM. B. BOSLEY,

Solicitors for Complainant.

PERCY V. LONG,

City Attorney;

ROBERT M. SEARLS,

Assistant City Attorney,

Solicitors for Defendants.

It is so ordered.

WM. C. VAN FLEET,
Judge.

Endorsed: Filed Dec. 15, 1916. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

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VOLUME 2.

Copy.

In the Southern Division of the District Court of the United States
in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and
Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
et al., Defendants and Respondents.

*Condensed Statement of Evidence Prepared Pursuant to Equity Rule
No. 75 and Order of Court Approving the Same.*

Endorsed: Filed April 5, 1922. Walter B. Maling, Clerk.

- 269 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and James Rolph, Jr., Mayor of said City and County, Defendants and Respondents.

Condensed Statement of Evidence Prepared Pursuant to Equity Rule No. 75 and Order of Court Approving the Same.

- 270 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and James Rolph, Jr., Mayor of said City and County, Defendants and Respondents.

Stipulation and Order Approving Condensed Statement of Evidence.

It is mutually stipulated by and between the parties to the above entitled suits that the following condensed statement of evidence, prepared pursuant to Equity Rule No. 75 and consisting of pages numbered consecutively from 1 to 1553 inclusive, may be approved by the above entitled court or the judge thereof and be filed with the Clerk and become a part of the record in the above entitled suits for the purposes of the appeals which the plaintiff has taken from the final decrees in said suits.

Dated: San Francisco, March 31, 1922.

WM. B. BOSLEY,

Solicitor and Counsel for Plaintiff and Appellant.

GEORGE LULL,

JOHN J. DAILEY,

ROBERT M. SEARLS,

Solicitors and Counsel for Defendants and Respondents.

271 Pursuant to the above and foregoing stipulation, it appearing that the condensed statement of evidence mentioned therein has been properly prepared, the following condensed statement of the evidence, including both testimony and exhibits and consisting of pages numbered consecutively from 1 to 1553, both numbers included, is hereby approved and ordered to be filed with the clerk and made a part of the record for the purposes of the appeals pending from the final decrees in the above entitled suits.

Dated: San Francisco, April 4th, 1922.

(Sgd.)

WM. C. VAN FLEET,
United States District Judge.

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281 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and JAMES ROLPH, JR., Mayor of said City and County, Defendants and Respondents.

Condensed Statement of Evidence Prepared Pursuant to Equity Rule No. 75.

The above entitled cases, having been by order of court consolidated for trial and referred for hearing to Hon. H. M. Wright, Standing Master in Chancery, came on for hearing April 16, 1917, before said Master.

Mr. Robert M. Searls, counsel for defendants, announced that Mr. Percy V. Long, formerly City Attorney of the City and County of San Francisco, had been succeeded in office by Mr. George
282 Lull; that Mr. Lull had been substituted for Mr. Long as attorney of record; and that Mr. John J. Dailey, Assistant City Attorney, had been associated with Mr. Lull and himself as one of the attorneys of record for the defendants.

At the hearing before the Master, the plaintiff and the defendants, respectively, introduced evidence, a condensed statement of which, prepared as required by equity rule No. 75, is as follows:

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SUBDIVISION I.

Evidence Relating to Value of Properties Actually Used by Plaintiff and Useful in the Conduct of Its Business of Manufacturing, Distributing, and Supplying Gas to the City and County of San Francisco and Its Inhabitants.

A. Value of Lands.

Mr. E. B. HENLEY, a witness called by the plaintiff, having qualified as an expert in respect to the value of lands in said City and County of San Francisco, testified in substance as follows:

I am the manager of the land department of Pacific Gas and Electric Company. Mr. Murray F. Vandall, an expert employed by the plaintiff, Mr. Phillip V. Paschel, an expert employed by the defendants, and I have made and signed an inventory and appraisal of

seventeen parcels of land which are owned by the plaintiff. Of these, nine are used exclusively by the plaintiff in conducting its business of manufacturing, distributing and supplying gas to the City and County of San Francisco and its inhabitants; and the remaining eight are used by plaintiff partly in the conduct of its said business and partly in conducting the business of manufacturing and distributing electricity and for other purposes.

284 Said inventory and appraisalment which was introduced in evidence as plaintiff's Exhibit No. 1, contains a brief description of each of said seventeen parcels of land and shows separately the value assigned to each of said parcels. The value of each of said parcels shown in said Exhibit No. 1 was its market value for all purposes during the entire period from July 1, 1913, to June 30, 1916.

Mr. W. G. VINCENT, JR., called as a witness by the plaintiff, qualified as a valuation engineer, and testified in substance as follows:

I have investigated the use which the plaintiff has made, during the period of time covered by these cases, of the eight parcels of land mentioned above which were used by plaintiff partly in its said gas business and partly in its electric and other business, and have made an apportionment of the total value of each of said eight parcels on the basis of the use which has been made of them by the plaintiff in its said gas business and in its electric and other business during the three years from July 1, 1913, to June 30, 1915.

The witness presented a statement setting forth his apportionment of the value of each of said eight parcels of land.

285 This statement was admitted in evidence as plaintiff's Exhibit No. 2.

Counsel for defendants admitted the correctness of the inventory and appraisalment contained in plaintiff's Exhibit No. 1 and the correctness of the apportionment of the value of each of the eight parcels of land which were used by the plaintiff in its gas business and for other purposes as set forth in plaintiff's Exhibit No. 2.

The value in the aggregate of the nine parcels of land used exclusively in plaintiff's gas business and that portion of the value of the remaining eight parcels which was apportioned to the plaintiff's San Francisco gas department, as shown in said Exhibits Nos. 1 and 2 and as found by the Master (see Master's report pp. 14 and 148) was—

From July 1, 1913, to June 30, 1915.....	\$900,816.92
From July 1, 1915, to June 30, 1916.....	\$919,568.71

With respect to this finding of the Master, no error has been assigned by plaintiff on its appeal from the final decrees in the above entitled suits.

Plaintiff's ownership and possession of all of the aforesaid lands were admitted by counsel for defendants.

286 B. Value of manufacturing and distributing plant, consisting of structures, machinery, apparatus, equipment and appliances.

1. Reproduction value or estimated cost of reproduction.

Mr. EDWARD C. JONES, a witness called by the plaintiff, testified in substance as follows:

I am chief engineer of plaintiff's gas department and have occupied that position since the plaintiff commenced active operations at the beginning of the year 1906. Prior to 1891 I was assistant engineer of the Boston Gas Light Company. I was assistant engineer of the San Francisco Gas Light Company and its successor, San Francisco Gas and Electric Company, from 1891 until about 1899 when I became chief engineer of the last named company. From 1902 until 1906 I was chief gas engineer of California Central Gas and Electric Company and California Gas and Electric Corporation. I have planned and supervised the construction of numerous gas manufacturing plants in the State of California including the greater part of the works used by the plaintiff in manufacturing gas for distribution in the City and County of San Francisco. As gas engineer I have had charge, not only of the construction of gas manufacturing plants and distributing systems,
287 but also of the manufacture and distribution of gas for many years. I am a member of the American Society of Mechanical Engineers, the Guild of Gas Managers of Massachusetts, the Pacific Coast Gas Association and the American Gas Institute. I am also an honorary member of the New England Association of Gas Engineers. I was president of the American Gas Institute during the year 1915.

During the summer and early autumn of the year 1914, I made an inventory and appraisalment of all of the gas manufacturing works and plants and gas distribution systems used by the plaintiff in supply the City and County of San Francisco and its inhabitants with gas for light and fuel purposes as those works, plants and systems existed on the 30th day of June, 1914. The work of preparing this inventory and appraisalment was done directly by myself with as little aid from subordinates as possible.

After completing this inventory and appraisalment, a copy of it was delivered to the City Attorney of the City and County of San Francisco and was by him delivered to said city and county's engineering department. A corps of engineers and experts, acting under the direction and supervision of Mr. N. Randall Ellis, all of whom were employed by the City and County of San Francisco, spent several months in examining and appraising the properties included in my inventory and appraisalment. I placed at
288 their disposal, not only my inventory and appraisalment, but all of my field notes and data.

Frequent conferences were had between myself, Mr. Ellis and other engineers and experts employed by the defendants. As a re-

sult of these conferences, numerous adjustments and minor changes were made in my original inventory and appraisalment. Some differences between myself and Mr. Ellis were referred to Mr. A. M. Hunt, an engineer of ability and high standing, who was employed by the City and County of San Francisco specially for this purpose.

The result of all this work and these conferences and finally the deduction from the total of my appraisalment of the sum of \$41,964.34, necessary to bring about a complete agreement, was an agreed inventory and appraisalment of all of the gas manufacturing works and plants and gas distributing systems owned and used by the plaintiff in supplying gas to the City and County of San Francisco and its inhabitants. This inventory and appraisalment does not include any lands, franchises, patent rights, going concern or established business. The total estimated cost of reproduction of the properties covered by this inventory and appraisalment and included in the final summary as the same existed at June 30, 1914, is the sum of 289 \$13,066,201.55. (From the total sum representing the appraised reproduction value of said works, plants and systems there was subsequently deducted the sum of \$109,802.00 which represented the estimated cost of leveling the site of plaintiff's gas works at the Potrero, it appearing that the appraisers of the plaintiff's lands had, in appraising said site, estimated its value in its present condition after the work of leveling had been done. The deduction of this item leaves the appraised reproduction value of said manufacturing works, plants and systems the sum of \$12,956,399.55, the amount stated on page 15 of the Master's report.)

This inventory and appraisalment was admitted in evidence and marked plaintiff's Exhibit No. 3.

In making said inventory and appraisalment, the unit prices of materials and wages of labor employed represented an average of current prices for the period from 1908 to 1914, inclusive, with the omission of one year in which the price of cast iron was unusually high. In preparing this inventory and appraisalment, I had the benefit of my notes which I had kept for many years and which showed the actual cost of construction of many parts of the properties included in said inventory. Since the preparation of 290 said inventory and appraisalment the prices used in its preparation have invariably increased. In the case of a few structures which were obviously and visibly in a deteriorated condition, the appraised value thereof shown in said inventory and appraisalment is the present value estimated with proper allowances for accrued depreciation and not the reproduction value or estimated cost of reproduction. In the final summary which is contained in this inventory and appraisalment, only property either actually used or maintained in readiness for use in manufacturing and distributing gas to the City and County of San Francisco and its inhabitants is included, all inoperative property being excluded.

In the inventory and appraisalment (plaintiff's Exhibit No. 3) of the plaintiff's manufacturing plants and distribution systems, the

estimated direct cost of materials and labor entering into the cost of reproduction or reproduction value are first shown and to this direct cost there is then added ten per cent. This item of ten per cent. is explained on page 311 at the end of volume 4 as follows:

"Ten per cent. (10%) has been added to the value of all items in actual use, but this has not been added to material, supplies and other items to which it may not rightfully be applied. This addition of ten per cent. (10%) includes six per cent. (6%) for
291 engineering and superintendence; four per cent. (4%) includes the cost of organizing a construction force, delays in shipment of material, excess freight, inclement weather, casualty insurance and piece-meal construction."

This item of ten per cent. which has been added to the estimated direct costs is a part of what is generally called "overhead expense" which enters into and constitutes a part of the cost of construction of gas manufacturing and distribution systems. The items which I have included are those with which I am familiar in my experience as an engineer. I consider six per cent. as an allowance for engineering and superintendence to be reasonable in view of the risks involved and the skill required and also in comparison with the commissions or fees charged by architects. I have had occasion to investigate carefully the elements covered by the item of four per cent. included in the ten per cent. already mentioned, and think that it may be a little bit low. I believe that ten per cent. is sufficient for engineering overhead. I have not added this ten per cent. allowance in appraising the materials and supplies on hand or tools or pavement over mains.

At this point it was agreed by counsel for plaintiff and defendants that the appraised reproduction value of the structures and properties included in said inventory and appraisalment included all elements entering into the estimated cost of reproduction except the cost or expense of general administration,
292 including taxes, and interest during construction.

Counsel for defendants also admitted that the city's engineers had examined the above mentioned inventory and appraisalment and were in agreement with Mr. Jones as to quantities and as to the estimated cost of reproduction or reproduction value of the items inventoried, but reserved the right to consider further whether or not certain items included in the inventory and appraisalment ought to be classed as operative property required for the manufacture and distribution of gas for use in San Francisco.

The property which I have included in my inventory and appraisalment, except a few minor items in respect to which I have made an allowance for deterioration actually and visibly accrued, was kept in good condition and was fully efficient, as efficient as our knowledge of the state of the art permitted; and all of the apparatus in-

cluded in this inventory, except as otherwise noted therein, was in excellent condition and useful.

All of the property included in this inventory and appraisal and the value of which is carried forward into the general
293 summary was actually in use at June 30, 1914, except certain parts which were held in reserve and maintained in condition for use in case of emergency or at times when other units were undergoing repairs.

Included in this inventory and appraisal are three gas manufacturing plants; one located at North Beach in San Francisco which is designated as the "Metropolitan Station," another at the Potrero in San Francisco and designated as the "Potrero Station," and the third situated in San Mateo County a short distance south of the southern boundary of San Francisco and designated as "Martin Station." The Potrero Station consisted of two parts, viz., certain generators and works used in the manufacture of oil gas and certain other generators and works used for the manufacture of so-called "water gas," the latter being generally referred to as the Independent Plant.

Martin Station was maintained and kept in condition to be used as a gas manufacturing plant until May, 1915, when two new oil gas generators were brought into use at the Potrero Station. The plant at Martin Station had been maintained in readiness
294 for use as a standby or reserve plant from a time prior to June 30, 1913, until it was abandoned as a part of the plaintiff's operative property in May, 1915. It is my opinion that it was necessary to maintain the plant at Martin Station in readiness for use in order to assure adequate service in San Francisco until that plant was abandoned in May, 1915.

The new gas generators which were brought into use at the Potrero in 1915 were not included in my inventory and appraisal as we had only just commenced their construction at the time when this inventory and appraisal was made.

All of the property included in my inventory and appraisal exclusive of the plant at Martin Station was actually in use or maintained in readiness for use during the entire period beginning July 1, 1913, and ending June 30, 1916, with minor exceptions. Some parts or units of that property were replaced with other similar units, some units were abandoned, and various extensions and improvements were added and changes made.

From the time when the two new oil gas generators, which we generally refer to as the new Jones sets, were completed and brought into operation in May and June in 1915 and the plant at Martin
295 Station became obsolete and was abandoned, the water gas works designated as the "Independent Plant" were classed as reserve or standby apparatus. Said Independent water gas works were not actually used after July, 1915, but I considered it necessary to maintain them in readiness for operation in case of emergency. It was necessary to operate the Independent water gas works in conjunction with the older oil gas generators at the Potrero whenever operation of the new Jones sets had to be suspended

for cleaning or repairs and during peak demands. The older oil gas generators at the Potrero Station, which we commonly refer to as the old Jones sets and which are included in this inventory and appraisalment, were actually in operation practically continuously during the entire period from July, 1, 1913, down to May or June in 1915, and have all been used since that date from time to time as required to supplement the output of the new Jones sets and to serve as a substitute for them when the new sets were being cleaned or repaired. I purpose to erect in the near future two additional new Jones sets which, when completed, will serve to meet the growing demand for gas and will permit the abandonment of the Independent water gas works. But until the two additional new sets shall have been erected and in readiness for operation, I consider it absolutely necessary to maintain the Independent water gas works in
296 readiness for operation. The new Jones sets have been constructed in accordance with a new invention, and in their operation a recently invented process of manufacturing oil gas is employed.

The oil gas generators at the Metropolitan Station were reconstructed in 1912 and subsequent changes were made in them in 1913 and 1914. These generators were reconstructed while I was experimenting with and perfecting the new inventions which were subsequently more fully applied in the construction and operation of the new Jones sets at the Potrero. The changes made in the generators at the Metropolitan Station resulted in increasing their efficiency and their capacity. The generating works at the Metropolitan Station were all in use almost continuously during the period from July 1, 1913, to June 30, 1916. As the the generating works at the Metropolitan Station and the new Jones sets at the Potrero Station have not sufficient capacity to meet the peak demands during the winter season without occasional operation of the old Jones sets, it is necessary to have standby apparatus.

The plaintiff's gas distribution system included in my inventory and appraisalment and in the final summary was all in use at June 30, 1914, and, in my opinion, necessary for use in giving
297 service in San Francisco. Of course, before and since that time changes have been made, additional mains have been laid and some mains have been replaced. A record is kept of all these changes. In some of the streets of San Francisco there are more than two gas mains. The distribution system in its present condition is the result of growth and development from the construction of competitive systems and subsequent consolidations. It is not an ideal system, but it is serviceable. When additional gas main capacity is required, it is often more economical to lay an additional main than to replace the existing mains with new mains of larger capacity. The substitution of a new main for an old one involves interruption of service. I am convinced that the multiplication of mains in streets due to competition has resulted in a condition that is not ideal. This system, however, exists and its use has resulted in a great saving to the consumers in San Francisco. The gas service in San Francisco is good. The distribution system has kept pace

with the growing needs of the community. In my opinion, the mains constituting the distribution system as described in my inventory and appraisalment were, on June 30, 1914, doing good service and were required for that service. I cannot say that any of the mains included as a part of the distribution system
298 in my inventory and appraisalment were not necessary at that time nor can I say positively that all of them were necessary.

Mr. W. G. VINCENT, JR., witness recalled by the plaintiff, testified as follows:

I am familiar with the inventory and appraisalment made by Mr. E. C. Jones and already admitted in evidence as plaintiff's Exhibit No. 3. In my experience as a valuation engineer, I have had occasion to consider the elements or items that enter into and constitute the reproduction value or estimated cost of reproduction of structural property and apparatus and have considered the items that are classed by valuation engineers as overhead charges. I have considered the items or elements which are embraced in the overhead charges amounting in the aggregate to ten per cent. appearing in Mr. Jones' inventory and appraisalment. Those items include only the overhead expenses which would be incurred under the direction of the chief engineer in the work of construction and do not include any allowance for the cost of legal services, the cost of accounting and other administrative expense. Consequently, the cost or expense of general administration including legal and accounting expenses
299 and interest paid for the use of money during construction should be added to the total amount shown in the summary in Mr. Jones' inventory and appraisalment. Administration expense covers legal and executive expense, accounting, purchasing, rent of offices used by executive departments, and miscellaneous items such as the use of automobiles, telephones, stationery, etc. Neither administrative expense nor interest during construction are included in Mr. Jones' appraisalment.

I have made an extensive study for several years past of the actual costs entering into construction which are generally classed as administrative and other overhead expenses. From my study of this subject, I conclude that a reasonable amount to be added to Mr. Jones' appraisalment for administrative expenses would be four per cent. of the totals given by Mr. Jones and that to the total amount thus obtained there should be added a further amount equal to three per cent. of such total to cover interest during construction. The allowance of three per cent. for interest during construction I consider a minimum allowance.

I have prepared a statement in which I have adopted as the basis of my calculation the total appraised reconstruction value of the properties covered by Mr. Jones' inventory and appraisalment. That total is the sum of \$12,956,399.55. To this total there should
300 be added in my opinion, as shown in this statement, for administrative expense including taxes and interest during construction, the sum of \$906,542.25. The addition of this amount

will give us the sum of \$13,862,941.80 as a new total representing the complete appraised reproduction value of the properties covered by Mr. Jones' inventory and appraisal at June 30, 1914.

This statement was thereupon introduced in evidence and marked as plaintiff's Exhibit No. 4.

I have prepared a statement which shows, in addition to the appraised reproduction value of plaintiff's gas manufacturing plants and distribution system at June 30, 1914, as appraised by Mr. Jones, the cost of additions and betterments and the original cost or appraised value of properties abandoned or replaced during the year beginning July 1, 1913, and ending June 30, 1914. This statement also contains the results of my appraisal of the plaintiff's principal office building, certain warehouse buildings, furniture and fixtures, and certain supplies, and an apportionment of the appraised value of such properties to the plaintiff's gas department. These properties were not included in Mr. Jones' inventory and appraisal although they were in use at June 30, 1914. That part of

the value of the properties appraised by me as aforesaid which
301 I have apportioned to plaintiff's gas department is represented by the sum of \$158,288.88. The addition of this item to the total appraised reproduction value of the properties covered by Mr. Jones' inventory and appraisal gives us the sum of \$14,021,230.68 which represents the total reproduction value of all of plaintiff's structural properties used in conducting its gas business in San Francisco.

I have ascertained from the plaintiff's books of account and other records the actual cost of additions and betterments made to the plaintiff's properties included in the Jones inventory and appraisal during the year beginning July 1, 1913, and the cost or value as appraised by Mr. Jones of the structural properties abandoned or replaced. The results of my investigation of the facts with respect to these matters are disclosed in the last mentioned statement and I have reached the conclusion, based upon the appraised reproduction value of said properties at June 30, 1914, and the amount of additions and betterments and the amount of abandonments, that the reproduction value of plaintiff's aforesaid manufacturing plants and distribution systems was, at June 30, 1913, the sum of \$13,783,022.62, and that the average value of said properties in use during the year ending June 30, 1914, was \$13,902,126.65, all as

302 shown in the statement which I now present.

The last mentioned statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 5.

I have conducted a similar investigation and prepared a similar statement showing additions and betterments and also abandonments during the year commencing July 1, 1914, and ending June 30, 1915. The results of my investigations are shown in the statement which I now present to the court. This statement shows that the reproduction value of plaintiff's gas manufacturing plants and dis-

tribution systems used in supplying the City and County of San Francisco and its inhabitants with gas had a reproduction value at June 30, 1915, of \$14,289,371.61 and an average reproduction value for the year ending June 30, 1915, of \$14,155,301.15.

The last mentioned statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 6.

I have made a similar investigation and have prepared a similar statement showing additions and betterments and abandonments during the year beginning July 1, 1915, and ending June 30, 1916, and the reproduction value of said gas manufacturing and distribution systems at June 30, 1916, and the average value for that
303 year. In this statement I have deducted from the appraised reproduction value of said properties at June 30, 1915, the entire appraised reproduction value of the gas manufacturing plant at Martin Station and have added the cost of the two new Jones sets at the Potrero Station which were completed and brought into operation in May and June in 1915. As a result of making the necessary adjustments for additions and betterments and properties abandoned or replaced, I have ascertained that the total appraised reproduction value of the aforesaid gas manufacturing plants and distribution systems at June 30, 1916, was the sum of \$14,487,998.04, and that the average reproduction value of said plants and systems for the year ending June 30, 1916, was the sum of \$14,256,399.20.

The last mentioned statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 7.

In none of the exhibits marked as plaintiff's Exhibits Nos. 3, 4, 5, 6 and 7 is there included any estimate of the value of plaintiff's patent rights, working capital, franchises or going concern.

304 Mr. H. B. HENDERSON, a witness called by the defendants, testified as follows:

I am twenty-six years of age, reside in Oakland, California, and am an assistant engineer in the valuation department of the city attorney's office of San Francisco. I am a graduate of the College of Mechanics in the University of California. I have been the chief assistant of Mr. N. Randall Ellis in making an inventory and appraisal of the plaintiff's gas manufacturing plants and distribution systems used in supplying gas in San Francisco. Acting under the direction of Mr. Ellis, I have had charge of the preparation of statements showing the results of our work.

The witness thereupon produced five statements which he testified had been prepared by him under the direction of Mr. Ellis.

The first of these statements is entitled "Detailed summary of E. C. Jones' Appraisal with Adjustments and Showing Segregation of Ten Per Cent Overhead", and was admitted in evidence and marked defendants Exhibit No. 9.

The final summary contained in said Exhibit No. 9 shows, as the total appraised reproduction value of the properties covered
305 by the Jones inventory and appraisal, after the deduction of certain agreed amounts including the cost of leveling the site of the gas plant at Potrero Station, the sum of \$12,956,399.55 at June 30, 1914, which is the same as the amount shown in plaintiff's Exhibit No. 4.

The second statement produced by the witness is entitled "Application of Additional Overhead and City's Deductions to E. C. Jones' Valuation of June 30, 1914." This statement was admitted in evidence and marked defendants' Exhibit No. 10.

Defendants' Exhibit No. 10, starting with the agreed appraised reproduction value shown in Exhibit No. 9, contains Mr. Ellis' estimate of the amounts to be added for additional overhead expense. The additional amounts here shown are two per cent for administrative expenses, including legal expenses and taxes during construction, amounting to \$211,009.13, and three per cent for interest during construction amounting to \$388,300.32. The addition of these two items to the final total shown in Mr. Jones' inventory and appraisal and in defendants' Exhibit No. 9 makes the total appraised reproduction value of the properties covered thereby, according to Mr. Ellis, \$13,555,709.00 at June 30, 1914.

306 Included in defendants' Exhibit No. 10 is a schedule containing a description of certain items, together with the reproduction value thereof as appraised by Mr. Jones, which counsel for defendants contended ought not to be included in the inventory of plaintiff's gas manufacturing plants and distribution systems as used and useful or operative properties. A copy of this schedule, with the addition of overhead allowances for administrative expense, including legal expenses and taxes and interest during construction, is as follows:

City's Deductions From E. C. Jones' Appraisal.

	From E. C. Jones' appraisal.	
	Page No.	Valuation.
1. Martin Station	249	\$472,725.77
2. Lampblack & Briquettes at Potrero Station	112	11,579.28
3. Lampblack & Briquettes at Metropolitan Station	217	1,154.40
4. Intermediate Overhead on St. Lamps (Office & Spvn.)	284	14,247.09
5. Commercial Arc Lamps	290	142,982.66
6. Duplication of Mains .....	...	135,702.83
7. Pavement over duplicated mains .....	...	49,554.21
8. Pavement Eliminated .....	...	234,781.14
9. Cutting Pavement not Installed by Company .....	...	34,667.78
10. Amount paid by Consumers on Service Connections 1906-12 .....	...	120,796.91
11. Estimated Amount paid by Consumers prior to fire on Services still existing .....	...	100,000.00
12. Deductions for paving not installed by Company on which Information is lacking .....	...	325,000.00
Total carried forward		\$1,643,192.07
307 Total brought forward		\$1,643,192.07
Add administrative expense, including legal expenses and taxes .....	...	14,551.38
Add interest during construction .....	...	32,976.38
Total including all overhead		\$1,690,719.83

Subsequently, during the examination of Mr. N. Randall Ellis, defendants' Exhibit No. 10 was corrected by subtracting, from the total amount of the deductions claimed, the sum of \$225,000.00 because Mr. Ellis testified that, if Martin Station had been abandoned and excluded from the inventory and appraisal, it would have been necessary for the plaintiff to construct additional gas generators at its Potrero Station at a cost of \$225,000.00. Defendants' Exhibit No. 10, as corrected, shows, as the appraised reproduction value at June 30, 1914, of plaintiff's operative properties included in Mr. Jones' inventory and appraisal after deducting the appraised value of the items which the defendants contended should be excluded, the sum of \$12,089,989.17.

The third statement produced by this witness was admitted in evidence and marked defendants' Exhibit No. 11.

This statement contains an appraisal and apportionment of the appraised value of the plaintiff's head office building and other properties which are described in plaintiff's Exhibit No. 5 and shows a total value assigned to these items of \$156,940.97. Defendants' Exhibit No. 11 contains Mr. Ellis' estimate of net additions and betterments during the year ending June 30, 1914, and in conclusion shows his estimate of the average reproduction value of the used and useful parts of plaintiff's aforesaid gas manufacturing plants and distribution systems for the year beginning July 1, 1913, and ending June 30, 1914, namely, the sum of \$12,127,826.11.

The fourth statement produced by this witness was admitted in evidence and marked defendants' Exhibit No. 11.

Said Exhibit No. 12 shows Mr. Ellis' estimate of additions and betterments and also his estimate of the average reproduction value of the used and useful parts of plaintiff's said manufacturing plants and distribution systems for the year beginning July 1, 1914, and ending June 30, 1915, such average value being the sum of \$12,407,290.39.

The fifth statement produced by this witness was admitted in evidence and marked defendants' Exhibit No. 13.

Said Exhibit No. 13 contains Mr. Ellis' estimate of plaintiff's net additions and betterments and of the average reproduction value of the used and useful parts of its said gas manufacturing plants and distribution systems for the year beginning July 1, 1915, and ending June 30, 1916, such average value being the sum of \$12,803,103.90.

This witness further testified that he had prepared under Mr. Ellis' direction a statement showing the details of Mr. Ellis' estimate of the amounts which counsel for defendants contended should be deducted from Mr. Jones' inventory and appraisal for duplication of mains and for pavement over duplicated mains, said amounts being items 6 and 7 in the schedule quoted above from defendants' Exhibit No. 10 and totalling \$185,257.04.

The last mentioned statement was admitted in evidence and marked defendants' Exhibit No. 14.

Mr. N. RANDALL ELLIS, a witness called by the defendants, testified as follows:

I am forty-one years of age, reside in San Francisco and am a civil engineer. My occupation at present is that of valuation engineer. I have been following my profession as a civil engineer for approximately twenty-two years. I was with the Blue Lakes Water Company and the Stockton Water Company from 1894 until 1904. The last four years of that period I was superintendent of construction in the water department of the Standard Electric Company of California. In 1906 I was manager of the Humboldt Construction Company and secretary of the Humboldt Transit Company engaged in the installation of power plants and electric railway work. During 1906 and 1907 I was assistant to the

chief engineer of the Shattuck-Eddinger Construction Company. In 1907 I became engineer for the contractors for the Market Street sewer system. Subsequently, I was engaged in railroad construction and for a time on the Los Angeles aqueduct. In 1911 I returned to San Francisco and was with J. G. White and Company for a short time and then was employed by the Board of Supervisors of San Francisco as engineer for about a year. Since that time I have been valuation engineer for the San Francisco city attorney's office. During this time I have been engaged in the study of gas, electric, telephone and water systems. During my present employment I have made a study of the history of the gas industry in San Fran-

cisco and of the various gas companies which have been engaged in business there from time to time. I have made an extensive investigation and examination of the gas manufacturing plants and distribution systems used by the plaintiff in supplying gas in San Francisco. I considered these plants and systems in great detail with Mr. E. C. Jones, plaintiff's gas engineer. With reference to this matter, I have also conferred with Mr. A. M. Hunt, former chief engineer and general manager of the Independent Gas Company. On two occasions Mr. Hunt was employed by the City of San Francisco and we conferred on all of the vital points that came up for consideration.

I am thoroughly familiar with Mr. Jones' inventory and appraisalment already admitted in evidence at this hearing and marked plaintiff's Exhibit No. 3.

At this point Mr. Searls, counsel for defendants, said:

"It has been stated on the examination of the complainant's witnesses that practically all the factors in that inventory are, or at least the greater part of them were agreed to by the City's witnesses; with his Honor's indulgence I would like to have a brief statement in the record of just what the City's witnesses did in the way of agreeing with Mr. Jones on this so that it will not appear that we made a hasty examination of it and agreed offhand."

In response to this suggestion, of Mr. Searls', Mr. Ellis said:

312 "We received the inventory in the latter part of October, 1914; from that time on I personally devoted practically all of my time to the matter for six months; in the meantime I had two assistants who worked part of the time; this examination consisted of checking up the inventory, first the physical quantities, secondly the units; of drawing together all sorts of comparable information and first determining tentative costs and then holding many conferences with Mr. E. C. Jones and the basic figures were all agreed upon. The inventory of the physical property was thoroughly checked. The labor costs were based upon wages as at the date of the inventory. Materials on the average were based on a period of five years prior to the date of the inventory although cast-iron pipe was taken for a seven year period. Take the amount of labor used in determining the main items of pressure and they

will fairly represent the conditions under which the work has been done. Most of the construction of the distribution system has been done on such a scale of job sizes as to fairly represent wholesale working but at the same time not to justify any material increase for piecemeal construction. Costs of trenching, backfilling, pipe laying and so forth were carefully checked against numerous records we had in the city engineer's office and personal records of my own were found to be fair. One of the main points of controversy was services. On that we were at first divergent possibly \$7.00 a service. We went into the matter in great detail, Mr. Keppleman and myself going into the field on numerous occasions to amplify certain points. That matter was finally settled to our mutual satisfaction. On meters there were differences both ways, which resulted in the cutting down of certain costs of labor and raising the price of the meter itself, the individual price of the meter. On the matter of pavement, which was a large item, the actually existing pavement was carefully checked on out and unit prices determined to our satisfaction. The final result after all our conferences was a net deduction from the inventory as first submitted amounting to \$380,884, or a trifle under 3%; that was after all adjustments had been made."

313 The witness further testified as follows:

The appraisalment contained in Mr. Jones' inventory and appraisalment is in substance an estimate of the cost of reproduction or reproduction value of the properties listed therein. In preparing this inventory and appraisalment we attempted to get at the cost of these properties in the way in which they would be built. There are a few items contained in the inventory and appraisalment in the appraisalment of which allowance was made for apparent deterioration.

I estimated the amount of interest during construction that would enter into the cost of these properties would be three per cent of the direct costs. There is no need of discussing the engineering overhead of ten per cent included in Mr. Jones' inventory and appraisalment. I estimate that two per cent of the direct cost of labor and materials entering into the construction of plaintiff's manufacturing plants and distribution systems before the addition of the engineering overhead of ten per cent is a sufficient amount to cover administrative expenses and taxes during construction.

Plaintiff's gas manufacturing plant at Martin Station was originally constructed for the purpose of supplying gas for the operation of certain gas engines to be used for generating electricity, and perhaps for the purpose of generating a surplus for distribution in San Francisco. I do not think that plant was properly located with a view to supplying gas economically for distribution in San Francisco. It would have been more economical to construct equivalent gas generators at the plaintiff's Potrero Station and such sets would have cost approximately \$225,000.00. For this reason, I, in the preparation of defendants' Exhibit No. 10,

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have deducted the appraised value of Martin Station and added \$225,000.00 as the estimated cost of generators of equal capacity to be installed at plaintiff's Potrero Station. Martin Station has two disadvantages, and possibly three; first, its location; second, the fact that it is not an up-to-date plant; and third, it was hardly necessary at any time, so far as I can see, for the full capacity of the plant at Martin's Station to be held as a reserve. It is uneconomical in its costs; in other words, a plant of similar capacity could have been put in at a nearer point and at less cost.

Items two and three (lamp black and briquettes) in the list of the city's deductions from the Jones' inventory in defendants' Exhibit No. 10 appraised at \$12,733.68 have been excluded by
315 me for the reason that lamp black is a by-product of the manufacture of gas and that the cost of oil used in the manufacture of gas and lamp black as a by-product and also the cost of piling, handling, and disposing of and using the lamp black as fuel are included in the plaintiff's operating expenses and paid for by the gas consumers every year.

Item four in the list of deductions above mentioned, viz, intermediate overhead on street lamps, amounting to \$14,247.09, has been deducted by me partly on advice of counsel. This item represents an intermediate allowance of ten per cent on the labor of installing street lamp posts and services prior to the subsequent allowance of ten per cent on the total cost of the job. The reason for its inclusion as given by Mr. Jones was that it covered the expense of location and negotiations with city authorities on matters relating to street lighting. The street lamp condition necessitates constant negotiations before the lighting committee of the Board of Supervisors and necessarily certain expense devolves on the company. We felt, however, that all such expense was charged as regular operating expense and therefore ought not to be considered as a part of the cost of reproduction of the plant. In my opinion, the ten per cent
316 allowance added by Mr. Jones for engineering overhead is sufficient to include the expenses which Mr. Jones has shown separately in this item of intermediate overhead on street lamps.

The fifth item in the city's list of deductions is commercial arc lamps appraised at \$142,982.66. I deducted this item on the ground that these lamps were gas appliances and were not properly to be considered a part of the plaintiff's structures or capital necessary for the service of its consumers. I think these commercial arc lamps ought to be excluded from capital and all revenue derived from their use and expense incurred in maintaining them should be excluded from the revenue and expense accounts. From my investigation, I have arrived at the conclusion that the plaintiff's investment in and use of these commercial arc lamps was not profitable. The plaintiff charges the users of these lamps fifty cents per month for each arc lamp for trimming and maintenance in addition to its charges for the gas consumed by them.

Items six and seven of the city's deductions listed in defendants' Exhibit No. 10, namely, duplication of mains and pavement over

317 duplicated mains amounting in the aggregate to \$185,257.04, should be discussed together because, if the mains here referred to are excluded, the cost of cutting through and replacing the pavement over them should not have been incurred. The details which enter into these items are shown in defendants' Exhibit No. 14. In the preparation of that exhibit the basis which we adopted for excluding mains on the ground of lack of necessity was briefly as follows:

Where there are three or more mains in a street all under twelve inches in diameter, we excluded all but the larger two. We did not exclude any mains twelve inches in diameter or over because they are used as feeder mains. This basis is more or less arbitrary, but we believe it to be eminently fair to the company. A scrutiny of the maps will indicate that, where unnecessary duplication exists, it is due to the merger of different companies. It is my opinion that the mains which I have excluded as unnecessary do not serve any useful purpose but, on the contrary, result in greater leakage of gas. As a result of the company's removal, subsequent to June 30, 1914, of some of the mains which I deemed to be unnecessary at that time and for which proper allowance was made in ascertaining the plaintiff's net additions and betterments shown in the exhibits already in evidence, the amount deducted in the years following June 30, 1914, for duplication of mains should be diminished by the sum of \$18,184.40 as shown in schedule B of defendant's Exhibit No. 12.

318 Items numbered eight, nine and twelve should be considered together as they refer to my estimate of the cost of cutting through and replacing pavement which has been included in Mr. Jones' inventory as a part of the cost of reproduction of certain mains which, as a matter of history, I believe were actually laid before the streets were permanently paved, although, at the time when those mains were laid, there may have been a macadamized surface or other more or less temporary pavement the cost of cutting and replacing which would be very small in comparison with the cost of cutting and replacing the existing concrete pavements with asphaltum covering. Items numbered eight and nine include the estimated cost of cutting and replacing pavement which has been laid since the earthquake and fire of April, 1906. Item numbered twelve, amounting to \$325,000.00, covers my estimate of the cost of cutting and replacing pavements laid prior to April, 1906. The sources of information from which I compiled the data used as a basis of estimating the amounts of items numbered eight and nine were such as to enable me to make an approximately correct estimate. The sources of information and the obtainable data which

319 I employed in making up item No. 12 were far from satisfactory, although I think my conclusion was approximately correct. In preparing and compiling the data used in arriving at the final results shown in items numbered eight, nine and twelve, I conferred frequently with Mr. W. G. Vincent, Jr., the plaintiff's valuation engineer, and the members of his department, and together we examined the available records relating to this sub-

ject. In connection with this subject, I desire to say that, in the case of pavement over services, we have made no deduction from Mr. Jones' estimate of cost, and that any errors which I may have made to the disadvantage of the plaintiff in estimating the amounts represented by items eight, nine and twelve in the list of the city's deductions shown in defendants' Exhibit No. 10 would be counter-balanced by omission to make any deduction from the estimated cost of cutting and replacing pavement over service pipes. When repairs have to be made to gas mains and pipes and when units or sections of mains or pipes have to be replaced for any reason in streets which are paved, the cost of repairs or replacements will be affected by the existence of the pavements over the mains in the same way and to the same extent whether those mains or pipes were originally laid before or after the laying of the pavement.

320 Whether the additional cost of repairs or replacements due to the fact that pavements have been laid subsequent to the laying of the gas mains and pipes in the streets should be accounted for as a part of the cost of maintenance and replacement or should be accounted for as additional investment and shown as the cost of additions and betterments is a question of accounting upon which I am not prepared to express a positive opinion.

Items numbered ten and eleven in the city's deductions shown in defendants' Exhibit No. 10 are of the same character and may be treated together. The amounts shown opposite these items are the totals, as nearly as I can ascertain, of the charges made and collected by the plaintiff and its predecessors from consumers for installing gas service connections. In general the charge made by the plaintiff and its predecessors for installation of a gas service was a fixed amount; i. e., \$10.00. The actual cost of installing a gas service varies from a few dollars to as much as \$125.00. We estimated the average cost of installing services at a little more than \$25.00.

Before closing my testimony on the subject of the inventory and appraisalment of the plaintiff's properties, "we engineers would like to express our appreciation of the treatment that we had at
321 the hands of Mr. Jones concerning the general make up of his inventory which, in all my experience, is by far the most comprehensive one I have seen, and also that throughout the matter, his discussion made the work of cleaning up the points of the appraisal more a pleasure than an onerous burden. I think that is due to Mr. Jones, in view of the numerous sessions we sat in on with him."

At this point, the Master commented that some credit was due to the city's engineers, too, and counsel for plaintiff stated that he was convinced, from all the work done by the engineers representing the defendants and the engineers representing the company in this case, that they had been actuated by desire to ascertain the truth, to find the facts and to eliminate, so far as possible, such differences of opinion as could be eliminated by conferences and discussion.

Mr. EDWIN S. BRYANT, a witness called by the defendants, testified as follows:

I am forty-one years of age, reside at Los Angeles, California, and am superintendent and engineer of the Economic Gas Company.

322 I am a graduate of the University of Maine, and have been in California since 1907. I have had training along civil engineering lines since 1898. I was gas engineer and assistant to the superintendent of the Southern California Gas Company from 1909 to 1914. After that I was engaged by the City of Los Angeles as assistant engineer on the valuation of the Los Angeles Gas and Electric Company for six months ending April 1, 1915, when I took the position of assistant gas engineer for the Railroad Commission of the State of California. This position I occupied for twenty months or until January 1 of this year, when I was offered my present position. I have studied and familiarized myself with the problems connected with the generation of gas and gas distribution systems and have made a particular study of the plaintiff's gas distribution system in San Francisco. I have investigated the plaintiff's said gas distribution system with a view to ascertaining whether or not there was an unnecessary duplication of gas mains and pipes. I have employed in my investigation of this subject defendants' Exhibit No. 14 which was compiled by and under the direction of Mr. N. Randall Ellis. The gas distribution system in San Francisco is known as the "arterial" type and the mains are all linked together at street intersections, and high pressure feeder mains connected by regulators or valves with the low pressure mains
323 are employed to maintain the supply of gas. One of the advantages of this system is that, if there be a stoppage or break in one place preventing the flow of gas in one direction, consumers in general will have their supply maintained by gas coming in from other directions. My general conclusion from my studies is that at the present time there are a great many streets in the city in which there are mains which could be eliminated without interfering with an adequate supply of gas to consumers. My study shows that Mr. Ellis' eliminations of mains as unnecessary were not unreasonable and were at least fair to the plaintiff. It is advantageous to the consumers to have the gas mains articulated as the plaintiff's mains are because it makes the service more uniform and reliable. My study of the existing conditions in San Francisco was not sufficient to enable me to lay out a substitutional plan for gas distribution. If I were to lay out a plan for a gas distribution system to-day, I would plan to lay mains of sufficient capacity to provide for one hundred per cent. increase in the consumption of gas over that at the present time. One advantage in laying an additional main when existing mains have not sufficient capacity rather than taking up the existing main and substituting one of larger diameter for it is that by this means the company will avoid interruption of service to consumers. In general, this method
324 of procedure is more economical. Furthermore, in a city like San Francisco, an engineer charged with the duty of pro-

viding additional gas main capacity would have to take into consideration many problems arising out of the existence in the streets of water mains, sewers and conduits for telephone and telegraph lines and electric transmission lines which he would have to avoid disturbing. I think my study of the plaintiff's distribution system was sufficient to enable me to form a fair judgment of its condition.

Mr. GEORGE C. HOLBERTON, called as a witness by the plaintiff, testified as follows:

I am forty-seven years of age, reside at Redwood City, California, and am the district manager of the Pacific Gas and Electric Company in San Francisco. I have occupied my present position since 1911. During this period of time I have had general charge and supervision of the plaintiff's business of manufacturing and distributing gas in San Francisco. The commercial arc lamps which are listed in defendants' Exhibit No. 10 among the city's ex-
 325 clusions from Mr. Jones' inventory and appraisalment were used for lighting purposes in stores, restaurants, saloons and other public places. Our purpose in purchasing and procuring the installation of these arc lamps was to increase the sale of gas. The result of their installation was a very substantial increase in gas sales. The company charged a rental for these gas arc lamps and in addition charged regular rates for the gas used in them. The installation of these gas arc lamps increased our sale of gas approximately \$60,000.00 a year. We found that we could give better service and obtain more satisfactory results by owning these lamps and keeping them in a proper state of repair than by selling them outright to consumers. At one time we had as many as nine thousand commercial arc lamps installed. But before June 30, 1916, the number of those lamps installed had diminished considerably. The reason for this diminution was something of which we had no knowledge at the time when they were being installed; namely, the advent of a new type of electric lamp wherein the filament used for illumination was inclosed in a glass bulb filled with nitrogen. By June 30, 1916, I think the number of commercial gas arc lamps in use in San Francisco had diminished to about five thousand. The diminution in the use of commercial gas arc lamps was hastened by
 326 the activity of our competitors in procuring the installation of these new electric lamps known technically as the type "C" Mazda lamp.

Mr. E. C. JONES, recalled by the plaintiff, testified as follows:

The lamp black, together with the briquettes, made from the same, at the plaintiff's Potrero and Metropolitan Stations, which I have listed in my inventory and appraisalment, is a by-product from the generation of gas from oil. We are endeavoring to reduce the production of lamp black to a minimum. The oil used for manufacturing gas is charged as part of the cost of making gas; but, partly because of the quality of the oil and partly because of the

fact that our oil gas generators are not perfect, a certain part of the oil used is converted into lamp black. The lamp black so produced is used as fuel under the steam boilers that are operated in connection with our oil gas generators. If we did not have lamp black, we would have to use for that purpose some other kind of fuel—oil, coal or coke. In making my appraisal, I consider that the pile of lamp black in our yards was a supply of fuel available for immediate use. In my inventory and appraisal
327 I have included only so much lamp black as, in my opinion, is a fair supply of fuel for the company to have on hand for use under its boilers. I don't know anything about the accounting or bookkeeping in respect to this lamp black.

In appraising the street lamps included in my inventory, I added to the direct cost of those lamps a sum representing what the defendants' engineers refer to as intermediate overhead on street lamps before adding ten per cent for engineering overhead. This intermediate overhead charge represents my estimate of the special or extra expenses which the owner of the gas distribution system incurs in connection with the installation of street lamps. Before street lamps are installed, it is necessary for the gas company to carry on negotiations with the lighting committee of the Board of Supervisors, to cause an examination to be made of the places where the street lamps are to be located to avoid placing such lamps where they will interfere with entrances to places of business and residences, to cause a report to be made to the municipal authorities, and then await the issuance of official orders or directions before commencing the work of installation. I considered this matter with Mr. Ellis on several
328 occasions, and at first was in some doubt about the propriety of including this extra charge, but finally concluded that it ought to be included in the cost of erection of street lamps. I do not know what the plaintiff's practice is with reference to accounting for this extra expense. I do not know whether the cost of services of this character are charged as operating expenses or as capital expenditures.

Mr. E. B. HENLEY, recalled by the plaintiff, produced the title deeds whereby the plaintiff, Pacific Gas and Electric Company, acquired title to its lands, gas manufacturing plants and gas distribution systems used in supplying gas in San Francisco. A brief synopsis of these title deeds is contained in plaintiff's Exhibit No. 31. The plaintiff acquired title to the properties constituting Martin Station by a deed dated January 28, 1908, which was executed to it by California Gas and Electric Corporation. The plaintiff acquired title to the rest of the aforesaid properties by two deeds—one dated November 27 and the other December 2, 1911—both of which were executed to it by the San Francisco Gas and Electric Company.

329 Mr. M. H. BRIDGES, a witness called by the plaintiff, testified as follows:

I am thirty-three years of age, reside in the City of Piedmont, California, and am the auditor of the Pacific Gas and Electric Company, plaintiff in this action. I have occupied my present position since February 15, 1912. As auditor, I have now, and have had ever since February 15, 1912, general charge and custody of plaintiff's books of account. About the beginning of January, 1906, Pacific Gas and Electric Company acquired by purchase more than ninety per cent. of the issued and outstanding shares of capital stock of San Francisco Gas and Electric Company and paid therefor partly in money and partly in five per cent. bonds which were issued directly to the vendors of said shares of stock.

N. B.—The Master, on pages 14 to 33 of his report, reviewed the evidence the substance of which has been set forth under this heading and found that the reproduction value of plaintiff's gas manufacturing plant and distribution system covered by the Jones inventory and appraisement (plaintiff's Exhibit No. 3) and
330 plaintiff's Exhibits Nos. 4 and 5 and defendant's Exhibits Nos. 9, 10 and 11 was, at June 30, 1914, the sum of \$13,719,400.04, and that the average reproduction value of plaintiff's said gas manufacturing plants and distribution systems during the period involved in this litigation was as follows:

For the year 1913-14 the sum of \$13,600,296.01;

For the year 1914-15 the sum of \$13,853,470.50; and

For the year 1915-16 the sum of \$13,965,192.00; and that, from the average reproduction value so found, there should be deducted, because of unnecessary duplication or multiplication of mains and for the estimated cost of cutting and relaying pavement over mains which the plaintiff or its predecessors had in fact laid before the paving was done, the following amounts:

	1913-14.	1914-15.	1915-16.
Duplication of mains....	\$193,356.09	\$175,172.69	\$175,172.69
Paving over mains.....	612,931.61	612,931.61	612,931.61
Total of exclusions	\$806,287.70	\$788,104.30	\$788,104.30

With respect to these findings of the Master, the only error assigned on this appeal is that the District Court erred in overruling plaintiff's exception to the Master's finding that the item of \$612,931.61 representing the cost of cutting and replacing certain pavement ought to be deducted from the appraised average reproduction value of the plaintiff's properties.

331 2. Depreciation attributable to deterioration, inadequacy and obsolescence.

Mr. E. C. JONES, recalled for the plaintiff, testified as follows:

I have made a study of the gas manufacturing plants and the distribution systems of the plaintiff in San Francisco as the same existed on June 30, 1914, with a view to ascertaining what it would have cost at that time to replace parts deteriorated or worn out or approaching the condition of being worn out. In this connection I have considered the expenditures which it would have been necessary to make at June 30, 1914, for the purpose of restoring said gas manufacturing plants and distribution systems to as good a condition as if they were new. In making this study, I have considered, not only the visible evidence of need of repairs, but also my experience with respect to certain portions of a gas plant which require annual repairs to keep them in new condition. While making my inventory and appraisalment of said plants and systems as the same existed at June 30, 1914, I examined the property carefully as I would if I were going to purchase it myself for the purpose of making gas and making money. I felt that the property was
332 worth for that purpose the total amount of money indicated in my appraisalment contained in plaintiff's Exhibit No. 3. Further, from my memory of the condition of those properties at that time and from a pretty fair knowledge of it, I have estimated the necessary expenditures which could have been made in one year to bring the plant to an absolutely one hundred per cent. condition so that there could be no question of deterioration other than some deterioration beyond any engineer's knowledge to see or anticipate, and for that I tried to provide by making ample allowance. In this study I have eliminated all consideration of contemplated changes that might become necessary because of present or approaching obsolescence. I consider obsolescence one of the greatest hazards of the gas business today. This opinion is based on the experience of having changed from one way of making coal gas to another, and then to a mixture of coal and water gas, and then to water gas exclusively, and then to oil gas, and after that making a complete revolutionary change in the method of making oil gas. In presenting my testimony with respect to depreciation attributable to deterioration, I shall make some allowance for inadequacy. However, the allowances for inadequacy will be differentiated from the
333 allowances for deterioration in the statement which I have prepared for the purpose of showing briefly the total amount of depreciation attributable to physical deterioration and inadequacy. In considering inadequacy, it should be noted that the tendency in the gas business today is towards building gas works in separate complete units so that, if there is no distinct change in the art, inadequacy will be provided for and remedied by the addition of new units by means of which the capacity of a gas manufacturing plant can be increased from time to time as required. As a practical matter, therefore, inadequacy needs special consideration only in connection with the gas distribution system. Inadequacy in a gas distribution system is taken care of by tying in by interconnections the existing mains and reinforcing the system by the addition of feeding mains.

"Mr. Bosley:

Q. Now, Mr. Jones, put yourself in the position of an engineer employed by a person or by a company contemplating the purchase of the gas property—that is, the gas manufacturing plant and distribution system of the Pacific Gas and Electric Company in San Francisco and put yourself in the position of advising him, if he were to employ you, and in connection with the employment direct you to ascertain what deterioration existed on June 30, 1914, in any parts of the plant, any deterioration that was visible
334 or that could be detected by making an examination, what replacements of parts would have to be made because of deterioration in order that this plant might be made in as nearly a perfect condition as possible even though such changes were not necessary immediately for the production and distribution of gas but would result in his having to expend money in the future, more especially the near future, in order to maintain his plant in its present condition; and from that point of view, Mr. Jones, state what, in your opinion, is a proper amount or would have been a proper amount on June 30, 1914, to provide for remedying accrued deterioration and to provide for the replacement of parts of the generating plant and distribution system that you could anticipate at that time would have to be abandoned and replaced in order to put him in a position where he would know what expenditures he would have to make to have his plant in as good condition as if it were new?"

A. With a knowledge of the appraisalment and how it was made, and remembering the fact that much of the property was appraised at less than cost, I would first advise the prospective purchaser that I believed the property to have a one hundred per cent service value, that it was worth that amount of money for conducting the business. A gas works is a very peculiar proposition; it is a good deal like a human being; alive and doing a prosperous business it is
335 worth a certain amount of money; dead it becomes a liability instead of an asset. I found that to be so by trying to realize scrap value on certain very expensive structures, carried in my appraisalment at large amounts of money; it became worth a minus sum when it came to tearing them down and disposing of the refuse material and filling up the hole in the ground. And with that in view, that it is an operating property and presumably making money, I would conscientiously advise a man that it had a value as stated in my appraisalment. If he insisted on a close scrutiny, based on years of experience in keeping the property going and keeping it in one hundred per cent condition, that is, by adequate repairs and maintenance and replacements and housekeeping—the painting and the general upkeep of the plant—I would go over the plant as I have done in preparing this exhibit and advise him in this way: that a berth for vessels at the wharf would naturally have to be redredged about every three years on account of the wash and the damage done to the berth by vessels carelessly docking, and at a cost approximately of

\$2,400.00 every three years. I would say that he should allow about \$800.00 for the years' dredging.

In looking over the old generator building, the end wall of the building is not in good condition. It has been in the same
336 poor condition for many years. I do not consider it dangerous, but to make that building good and new would cost about \$3,500.00 for repairs.

The Browning hoist at the lamp black separator is pretty badly worn out; to repair it would cost about \$7,500.00. At the time the appraisement was made there was good reason to anticipate the total abandonment of the separator and the lamp black hoist in front of the old generator house notwithstanding the fact that it was in use and necessary when the appraisement was made. I would take out the appraised value of that, or \$4,793.53.

The same reasoning applies to the Oliver filter, Cummer dryer and briquetting press. We found that there was a better way of filtering lamp black than by the use of the Oliver filter, and that it was not good practice for us to attempt to try to briquette lamp black for boiler fuel. As we anticipated the diminishing and almost the elimination of lamp black in our new process, we knew that we would not be called upon to market lamp black as a domestic fuel; therefore, the Cummer dryer and the briquetting press were transferred to the Oakland plant. The appraised value of that was \$38,981.53. That is the entire appraised value of the three items in the inventory and enters into my final total.

337 The reason for including these items here is a combination of inadequacy and of the fact that we desire to dispose of these articles because there will be no further use for them.

The lampblack shed was for the protection of the lampblack, but we found that it was rather a nuisance than otherwise, and so I would take out \$3,172.31 to cover that.

The Sterling boiler-room contained two Babcock & Wilcox and one Heine boilers of small size; they were in use and necessary at the time the appraisement was made; I have given them a value of forty per cent. As an explanation, I have just been permitted to make specifications for new boilers for the Potrero and they have been accepted. I would write off \$7,816.06 from those boilers. They are now taken out and we are awaiting the installation of the two new boilers. They have been in use ever since June 30, 1914, until quite recently.

One of the 500,000 foot relief holders was used for a tar tank, but I might say that it was abused as a tar tank. A gas holder should be used for one purpose only and not for the storage of thick tar; but at one time the holder was used for that purpose and the upper
338 lift of the holder was damaged. I have estimated the cost of replacing an entire lift and have put that down at \$11,-868.45.

The Mackenzie exhaustor, engine and foundation was removed to make room for an improved machine, the General Electric Rotary Compressor, and, although the Mackenzie exhaustor was a good piece of apparatus, it was not so good as the machine that has taken its

place. I have placed its value at fifty per cent. The exhauster and engine operated during 1914, 1915 and a large part of 1916. Fifty per cent of its value would be \$1,391.50.

In the purifying house, I find that it will be necessary to spend about \$200.00 for repairing the hydraulic hoist for lifting the lids of the old cast-iron purifiers. Otherwise the purifying house is in good condition; any repairs to covers or boxes would be covered by maintenance or repair accounts.

A portion of the salt water pump house was abandoned, amounting to \$275.00.

The water tanks on an overhead tower were used up to quite recently, but have been torn down and abandoned without salvage. I have given them a value of twenty per cent, amounting to \$2,757.04, which is the amount of deduction.

339 The 20,000 barrel oil storage tank on the wharf was deteriorated or depreciated in the appraisalment—either word would do in that instance. The original value of that tank I believe would be about \$13,000.00. I considered it simply a standby convenience for the storage of oil in case of emergency, of if we should have a surplus, and I wrote it down to \$2,143.05. I would consider that that should be written off entirely; that is, in advising this prospective purchaser as to what should be done to the plant.

At the Independent Station, considering it as a necessary standby station, there were two 100 horse-power return tubular boilers taken out. I have given them a value of twenty per cent.; deducting eighty per cent. it amounts to \$2,112.00. The boilers were taken out some time after the appraisalment was made.

There were some measuring tanks that I looked over and found it would cost about \$125.00 to repair them.

At the Metropolitan Station, a 200,000 foot relief holder lost one of its sections through an accident. It was really not due to deterioration. I believe it was due to structural weakness in the beginning. One section was abandoned and the holder was reinforced and made practically new. I have deducted \$6,792.77 for that.

340 "The Master:

Q. On the theory that, on June 30, 1914, that structural defect would have been evident to a close inspection and you would have taken it off; is that the idea?

"A. It goes farther than that, your Honor; it anticipates that a man might have an X Ray vision and look inside the holder; no external inspection would show the fact.

"Q. Then you have taken it off by hindsight rather than by foresight?

"A. Yes, your Honor.

"Q. The defect undoubtedly existed, but you only discovered its existence since?

"A. It developed; and I believe it developed from the same cause that the meter house fell down, and I have deducted the entire value as shown in the appraisalment for that, namely, \$1,829.71."

The witness then continued as follows:

There was an auxiliary exhauster house in use in 1914 from time to time—not always in use, but necessary, in my judgment—and I gave it a value of twenty per cent. for the use after the date of the appraisement, amounting to \$4,780.92.

341 In making this estimate I desire to say that it is not an accountant's estimate; my knowledge of bookkeeping would not enable me to do that; it is based on experience and judgment, and having built and lived with this property and having had experience with other properties. I suppose you will find flaws in the statement because, in putting down this exhauster house as abandoned property, there is no notice taken of salvage; that is, taking out machinery that was in good condition and allowing no value for it.

At North Beach Station one No. 10 Sturtevant exhauster was removed, value \$1,316.00. At the same time \$53.63 worth of countershafting was abandoned as not usable.

The Master:

"Q. When you refer to apparatus as having been removed or abandoned, that means removed or abandoned after June 30, 1914?"

"A. In every instance.

"Q. You are using your hindsight method right along in the cases of property subsequently abandoned or removed because of defects that might have existed on June 30, 1914, aren't you?"

"A. To such extent that defects that have developed since June 30, 1914, in some instances could not have been anticipated by anybody as of that date."

342 The witness continued:

Under the heading of "General" I believe that a gasholder should be painted every year, and, if painted every year, and properly painted, which means scraped and generally cleaned and overhauled and painted with good paint, it would cost \$12,308.20 to paint the holders in the inventory. With that care, the life of a gasholder upsets all theories; without that care, a gasholder might have any life. It is almost like two pewter plates. I have seen pewter plates that were said to have been brought over on the "Mayflower" and they were in condition as good as new. A careless housewife might buy a new pewter plate of equal value and quality and it would be destroyed in a few weeks or months by carelessness in handling and cleaning, and burning it—using it as a cooking utensil. The same reasoning applies to every part of a gas works. I don't know, your Honor, whether you want me to go on and preach, but this subject is very close to my heart and I feel a friendly feeling toward all of this apparatus, having lived with it so long, and I don't like to have it maltreated. I am not very well versed in the theories underlying the word "depreciation"; I suppose it is due to my thickness of skull, but I never have been able to under-

stand why a property that is kept up in one hundred per cent. condition and is appreciating every year through the exercise of intelligence and inventive skill in producing better results and larger capacity should be deliberately reduced in value on a theory that something may happen in the near future, that it may be abandoned or that it may deteriorate, when the showing by experience is that the property has been actually kept up in one hundred per cent. condition for many years and is in one hundred per cent. condition today. That does not apply to all gas properties. I believe that every gas property ought to be treated as an entity. I don't believe that any engineer in the world has the right to say that a certain gas property should be depreciated because it has an age of a certain number of years; it is often done without scrutiny of the properties, or a visit to the property, or without any knowledge whatever. I am simply asking your Honor to consider years of experience against a simple theory. That I consider necessary, your Honor, in view of what is to follow in this statement.

With reference to my experience with gasholders and the age of some of the gasholders here in San Francisco and their present condition, the gas holder that I recommended for repairs of about \$11,000.00 was built in 1872 together with its fellow gasholder—there were two of them in a nest. The tank was blasted out of a
 344 serpentine rock formation and in itself today would be considered as good as a tank with an ordinary skin lining of concrete. In those days a heavy brick tank was constructed inside of this rock excavation; they used cement generously. The tank has an indefinite life; there are no cracks in the tank. They were not affected by the earthquake. Of course, there was not very much effect by the earthquake on that rock formation at the Potrero. In the building of the holders charcoal iron was used, something that is almost unknown today. They were built in 1872 and are now forty-five years old. Any tables that I have been able to obtain—Dixie's and Dr. Humphrey's and others—give the life of a gas-holder as forty years. A short time ago I wondered if those holders that, under the ordinary theory, had a minus value of about twelve and one half per cent. and should appear in red figures in our books, did not need looking after. My opinion, based on observation, is that the metal in the holder is just as good today as the day it was put in. I know the material of which they are made and the care that has been given to them.

The Master:

Q. Do you know whether those experience tables to which you have referred—Humphrey's and others—are founded on physical deterioration alone or do they take into account as a matter
 345 of experience over many different plants the operation of obsolescence or inadequacy?

"A. I don't know how those tables are constructed. I have often wondered how a man could deliberately sit down and conceive a mortality table for gas properties. I feel entirely unable to do it myself.

"Q. I think the probability is they took an experience of gasholders throughout the country, their age of installation and their age of abandonment, and deduced therefrom a normal age of service. I don't think it is worth very much; I think in that event it would clearly provide for other factors than physical factors.

"A. It would if that were the basis, your Honor, but I am afraid that is not the way it was arrived at. I have been in the gas business forty-one years and in all of these life tables there are no items of physical properties that are given a life longer than forty years, except very large cast-iron mains, a certain class of buildings and real estate. In that forty-one years I have constructed a great many holders in different parts of the United States, and I have only had to tear down one holder on account of deterioration where the wear and tear necessitated the taking out of the bell of the holder, not the guide-frame which supports the bell in its rising and falling.

346 I renewed the bell in the year—well, guessing at it I would say about 1879 or 1880; I believe that holder was built before I was born; the metal in the holder was so good at that time that it was difficult to cut the holder to pieces; it had to be repaired on account of neglect in painting properly and scraping. It was an inclosed holder, in Boston, where the practice was to build a brick house around the holder, with a slate roof over it—a wooden roof covered with slate; that was of sufficient protection for the holder and they didn't paint the holder every year. That has been my only experience in taking down a holder in forty-one years on account of total deterioration due to wear and tear.

"Q. What is the nature of the deterioration that occurs, when it does occur?

"A. It is a pitting of the plates due to carelessness in painting. That pitting gets so general that it is like building a new barrel around an old bung-hole.

"Mr. Bosley:

Q. Pitting is caused by rust, isn't it?

"A. Pitting is due to rust, due to carelessness in the upkeep of the holder.

"The Master:

Q. There is no interior corrosion?

347 "A. Absolutely none, your Honor. Corrosion of metals, as I understand it, is due to oxidation or the effect of salts or acids on the metal. It is a well-known fact that gasholders, after having been in use for forty years, are absolutely clean so far as the metal is concerned, barring a coat of tar or oil on the inside surface of the metal. The same is true of gas mains. Whenever I hear a man talk about the internal corrosion of a gas main, I make up my mind he has never seen one. It does not occur.

"Q. What does the inside of a gasholder and the inside of a gas main look like?

"A. It looks like a piece of new iron out of the foundry or out of

the rolling-mill, with the single exception that it may be coated with oil vapors, which are protective in themselves, or a coating of tar. To make it a little more convincing, the interior of gasholders, gas scrubbers or gas mains are never coated for protection; it has never been considered necessary to protect them by paint or by asphalt or by any kind of protective coating. When we began the introduction of the high-pressure system, requiring steel mains or wrought-iron mains on account of the increased tensile strength and the resiliency of a steel main as compared with cast-iron which would be more brittle, we found it necessary to carefully coat the outside of
 348 the steel mains to protect them against corrosion, soil action; but we never thought of coating the inside of the mains; the mains never corroded on the inside."

On June 30, 1914, and, for that matter, since that time, the condition of all of the gasholders that the plaintiff has here in San Francisco was good, and they have been kept well painted. At that date there was no evidence of corrosion or rusting. During the period between 1902 and 1904 there was some neglect in the matter of painting gasholders. That has been, I think, entirely remedied by proper patching and scraping and painting since that time; notably the two million foot gasholder at North Beach, but the gasholder is in good condition today. It was made of mild steel, I think, but I don't know; it was after the days when it was possible to buy pure iron—of course, always keeping in mind that pure iron is advertised for sale today under certain trade names.

The rest of our gasholders are made of steel, and, if they are kept well painted and protected from the atmosphere, the same observations apply as to their endurance or their life because they show wear and tear and no defects. Neglect shows immediately. It is evident at Martin Station. It is like leaving a home. If you go away and leave a home absolutely without anybody being
 349 present, deterioration immediately sets in; it requires constant care to keep gas works in condition. Martin Station is deteriorating. I would not use the work neglect, but I would say that due to the fact that it was only considered a standby station until such time as the new process should permit us to abandon it, no money was spent in its upkeep for repairs. There was some deterioration there at June 30, 1914.

It has always been considered necessary to renew the checker brick in the oil gas generators annually, and, figuring the cost of the four old sets at the Potrero, it amounts to \$8,365.36. These were recheckered nearly every year; it would average, I should say, about once in thirteen and a fraction months; it was not quite twelve calendar months. In this estimate I have included the entire cost of recheckering the four old sets upon the theory that that is the actual cost of the labor and material for renewing the checker brick and putting the generators in good condition for one more year's service. This is done on the assumption that a purchaser taking it would anticipate that within the next few months he would have to entirely rechecker these four sets. He might purchase the plant immediately after the recheckering because the recheckering was always

done during the summer months; or he might have purchased the sets near the end of the period. I have anticipated, though, 350 that they needed rechecking and allowed the full cost. I should say that the condition on June 30, 1914, was better than this. We generally do the rechecking during the summer time during the time of the minimum demand for gas. We do this whenever we can spare a machine.

Now, as a blanket to cover the maintenance and upkeep of our generating plants, to include items that would be so small that it would require a long time to check up (and there might be many omissions), I have added \$75,000.00 a year to cover the repairs of minor parts of moving machinery, the painting and scraping and setting glass and keeping things in a general up-to-date condition in the plant. I consider that a very large sum, more than adequate.

Mr. Bosley:

"Q. Now, Mr. Jones, will you state from your experience what was the condition of the generating set on June 30, 1914, and what parts were subject to some wear that might necessitate replacement of parts, aside now from the checker brick; what about the shells of the generators?"

A. The shells of the generators were in good condition; they have been kept so by scraping and painting. If the shell of a generator shows corrosion or defects, it is in one or more plates and they are immediately renewed; for instance, the water gas sets at the Independent Station; two of them have been used since the Independent was built early in 1903; every sheet in every generator in the Independent plant has been renewed since that time. It is like the old story about the boy's jack-knife. One year the boy has a new blade put in; the next year he has a new handle put on the blade, and yet in the boy's eye it is the same old jack-knife, but still no portion of the original knife exists; it is simply the essence of the original knife. That same method of repairing applies to a gas generator and may be covered adequately by proper maintenance.

Mr. Bosley:

"Q. In the case of the Independent generators, I understand that those plates do have to be replaced from time to time, the plates constituting the shell of the generators?"

A. I am anticipating that that applies to all generators, but I have never known it to happen to an oil-gas generator. My experience with oil gas generators has only extended over fifteen years, but in that time I have never renewed a plate of steel in an oil gas generator. It is protected in a double way. It is protected from the heat by a very thick lining of fire-brick laid in fire-clay; between the brick and the shell there is a space about an inch wide and the insulating space filled with infusorial earth and pieces of asbestos. That serves a double purpose; it keep all moisture 352 from the steam leaks away from the metal and prevents corrosion. The temperature of the sheets never gets very hot—

seldom beyond a temperature but that you could put your hand on the shell. The outer part is protected with scraping and painting with the most approved paint. Every year we have new ideas about paints.

I have never been able, in my experience with oil gas generators, to observe any deterioration in the shells of the oil gas generators, with the exception of faulty construction in the beginning at our Station B, Oakland, where oil leaked out through the badly riveted seams; they are good but they don't look well. We have to calk them up and keep them in shape. The same sheets are doing service today that were put in in 1903. Aside from faults in construction, which may develop early, I have not observed any deterioration in the shells of our generators.

In my experience with reference to the necessity of recheckering the new Jones oil sets down at the Potrero, I found that, on account of more uniformity in heating, the checker brick will last longer. They are known as No. 5 and No. 6; No. 5 was started on the 3rd of May, 1915; No. 6 was started on the 4th of July, 1915. One date was my son's birthday—he collaborated with me. The other was the nation's birthday. I have recently made an examination of

353 both these sets. During the latter part of 1915, due to some faulty construction, an arch in No. 5 generator split; that is, it unkeyed, it came down and caught itself. I felt at that time that we would have to shut down and make repairs. We found, though, that the efficiency and the capacity of the machine was increased by the accident; and so we kept along and ran through the winter, and through this past winter and up to now. I found that the checker brick in No. 5 are just as good as they were the day when they were put in. As a matter of prudence, I am going to repair that arch this summer; I have been permitted to do so by the company. They have authorized an expenditure of the money. In doing it, I am going to overhaul the checker brick and replace any that show any wear or any that are broken in taking them out. There will probably be some lost in removing and replacing them. The checker brick in No. 6 are apparently as good as the day they were put in, which would give us some reason to believe that the life of the checker brick will be three years instead of one year as in the old sets. That is simply due to the exercise of care in the application of intense heat to the brick; that is, raising the temperature through a long range and then dropping it during a period of ten minutes. No brick will stand it. The better the brick, the
354 less it will stand it—using the word “better” in the sense of its refractory character, its ability to stand heat without fusing. Silica brick would fly to pieces like popcorn on account of its coefficient of expansion.

“The Master:

“Q. You mean that it will deteriorate under a quick rise and fall of temperature. I thought you did not say exactly what you meant there because you seemed to be showing that with the process that

you used and the application of heat as you applied it, the checker brick would have a longer life.

"Mr. Bosley: That was with the new apparatus.

"A. Let me explain that again because I don't want that in the record incorrectly——

"The Master: In other words, the rise and fall of temperature under what time would cause a disintegrating influence as against the time that you take now?

"A. With the old process it was usual to have a range of temperature—that is, a rise and fall in any given checker-brick amounting to about 1,000 degrees in ten minutes; with the new process that has been reduced to about 100 degrees or less in ten minutes—that is, the range in temperature. I found that the effect on any metal or any refractory material like fire brick by rapidly heating and cooling is like bending a piece of metal or *bending a piece*
355 *of metal* or bending a piece of wood until finally it disintegrates internally and falls apart; the brick simply break up into little cubes and fall down in the generator and block up the passages and it has to be removed."

In the new sets these conditions seem to be remedied by limiting the range of temperature, so that the brick lasts much longer, as proven in practice. The only other thing about our generators that tends to deteriorate when well maintained and taken care of is inside four inches of the linings; they are damaged more by heat accidents, and carelessness than they are by actual cautious use. By the linings I refer to the fire brick. The steel shells of the generators must be protected from internal heat, the combustion chamber, by a lining of fire brick. Those linings are intended to keep in the heat. Of course, they are built of fire brick of ordinary size. The four inch inside course exposed to the heat of the oil fire may possibly show signs of deterioration, may wear away or burn away. In the large generators we never have had to reline them. It only happens in little towns like San Rafael and Chico and Colusa and other small places where they have erratic conditions, where they force a machine and overheat. In our San Francisco generators the
356 inside of the lining becomes vitrified, like the old fashioned brown bean-pots, and that coating of vitrified fire material protects the joints and keeps the fire clay from spauling out. The lining of the No. 1 set in San Francisco was built in 1906 and is in excellent condition today. With reference to the valves and the controlling parts, in my opinion, there is only deterioration that may be observed and repaired in the actual daily operation of the plant. For instance, in the development of the new process we have tried to apply all of the new ideas to the operation of the old process without making too many radical changes in the old process. When the old sets at the Potrero were appraised in 1914, the stack-valves, scrubber-valves and blast-valves were operated by hand, by winches; today we have hydraulically operated valves, including stack-valves, scrubber-valves and blast-valves, on those machines. We have tried to apply the different method of operating them and making gas that

we found to be best in operating the new sets without the necessity of remodeling the old sets; so that the old sets today are in better condition as a gas generating plant than they were in 1914 when the appraisement was made; I consider them worth more money as a gas generating plant on account of the improvement we have added to them and applied to them.

357 In going through the rest of the generating plant at the Potrero and describing the different parts and stating whether or not they are subject to deterioration if well maintained, and what remedies, if any, we avail ourselves of to prevent deterioration, I would have to begin by saying that I am not attempting to set up the theory that things do not wear out or deteriorate. I am trying to say that, with proper care and maintenance, repairs and replacements of parts, this can be taken care of by a certain amount of expenditure of money in any year or during any period. By the proper maintenance and repairs and renewals a gas plant may be kept in practically one hundred per cent. condition, barring, of course, structural deterioration which I don't know much about; that is, what takes place inside of a sheet of steel due to, such as its getting old, which, during my experience in the gas business, I have not found to be serious or of such nature that it could not be observed and remedied.

The same principles apply to filters, scrubbers, purifiers and all apparatus in a gas works. It has been my experience that, if a connecting rod or a piston rod of an engine breaks, it is replaced; with proper machine shops and blacksmith shops and carpenter shops and paint shops, gas works may be kept up in perfect condition. Of course at the Potrero or Metropolitan Stations we think nothing of renewing a part of an engine, or an exhauster, or a compressor; we seldom send anything out of the works; we repair it right at the plant. In the case of a scrubber, the internal corrosion, even with the use of salt water, is negligible. The scrubbers which I built in 1891 at the North Beach Station are now doing service in California and are in just as good condition as the day when they were built. They have been kept scraped and painted and they look new; there are no visible defects in any of the metal parts. In twenty-six years' experience with the use of salt water scrubbers, I believe we were the first to discover that salt water could be used instead of Spring Valley water for washing gas. There was a theory in the East that there might be some mysterious connection between the sodium chloride in the water and some part of the gas, but we found that it was not so, and that we could use salt water as effectively as fresh water and save a good deal of money. The effect of the salt water on the inside of the scrubbers is not apparent. We find that the tar carried by the gas paints the inside of the scrubber and protects it from salt water. The tar is always renewed so that the scrubbers keep themselves painted. The same is true of other steel interior parts of apparatus where gas and salt water come in contact with metal.

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In the matter of purifiers, it goes back to the boy's jack-knife again. There are new covers put on the purifiers and new

boxes. In other words, there is a rotation of parts. The purifiers have an indefinite life. The same is true of station meters. The only part of a station meter that deteriorates is the drum. If that is kept clean and painted it will last a great many years; if it breaks down, it usually breaks down by corrosion and pitting; it may be patched; when it has been patched to such an extent that it is necessary to renew parts, then it means new parts or an entirely new drum. That may be taken care of by a proper allowance for maintenance.

I heard the other day a saying that struck me as being good, that depreciation might better be called deferred maintenance. It appealed to me because I have always felt that it was better to keep a plant in perfect order by the wise expenditure of money from day to day, than to let a plant rust out and go to the dogs with an imaginary fund back of it to build it up or replace it at some time in the future. It has always been my endeavor to keep up a plant so that it is in a one hundred per cent. condition.

There are no other parts whatever of the generating plant to which any different principles apply than those which I have just expressed, so far as my experience goes, always bearing in
360 mind that I know that things wear out and that they do deteriorate. But when the property is well maintained, those parts are repaired and replaced from time to time and the plant is maintained and good condition.

Buildings of the class that we have in our plants at the Potrero and the Metropolitan Stations are either brick or steel covered with corrugated iron. The brick buildings at the Potrero Station were built of good hard burned brick and were jointed with Imported Portland Cement. I believe that they are improving in their condition rather than deteriorating. Such changes have been made to the buildings that I consider the buildings as good today as they ever were.

In 1914, what was known as the new generating house looked as though it had no value whatever. The roof was stripped from it; the steel trusses and purlins remained, but all the covering of the roof was taken away and the building looked as though it were going to be demolished. We installed two new generators and the rest of the equipment and pointed up the joints of the building on the inside, painted it and renewed the roof. The building would be appraised today as a new building. There is not an apparent defect in the building or any show of wear and tear.

361 I am describing the building's appearance at June 30, 1914. It looked worthless. Today it has the appearance of being a new building; in fact, it is just as good as a new building.

The same reasoning applies to the office building, built in 1872, probably one of the oldest buildings on the property. That has been so well repaired and the changes that have taken place in its uses (it was a meter-room at one time and an office, and now it is an office and laboratory) have necessitated such repairs and renewals that that building today is just as good as new. No appraiser could possibly find a defect in that building nor would he

be able to say what the depreciation of the building was unless he was informed correctly as to the year in which it was built; that is to say, the age of the building; he could not guess the age of the building; and I don't see how telling him that that was built in 1872 makes any difference in the condition of that building.

With regard to the corrugated iron that we use on some of the buildings, we return again to proper maintenance; that is, the renewal of deteriorated sheets, of pitted sheets of iron. Corrugated iron is something that needs a great deal of care. It must
362 be painted and watched. Corrugated iron depends on many things for its life; the angle at which it is exposed to the atmosphere and to the rains, and the condition of the atmosphere—that is, a sheet of corrugated iron will last twice as long at the Potrero as it will at North Beach; if two sheets of corrugated iron are placed at different angles at North Beach, one will last twice as long as the other. It is simply a matter of purchasing the best corrugated iron and watching it and painting it—not neglecting it—and renewing it. I think than can be covered by maintenance. The roof can be covered a sheet at a time, if you please.

In looking over the life tables of gas properties, one would imagine that a critical time is always at hand; that is, if you had a certain amount of property in meters or services or mains that had a given life and the time of their demise was approaching, that you must get ready for a funeral; but in forty-one years that critical time has never occurred in my experience in the gas business; that is, the repairs and the renewals of street mains, services, meters, connections and the ordinary apparatus in a gas works, exclusive, of course, of obsolescence, has gone on in an even tenor without any jogs in the curve, and the critical death day has never come. That shows that, with proper maintenance, a gas works with its additions
363 and growth may proceed indefinitely through a term of years without any unusual replacements or unusual maintenance, of course keeping in mind that we must not have too many earthquakes or conflagrations or calamities of that kind. That is to say, suppose that, in a mortality table of gas properties, a gas meter is given a certain life, maybe twenty years by one man, maybe fifteen years by another and maybe ten years by another, and if those meters are marked with their age (I mean, if a certain number of new meters are put in use), at the end of twenty years (I believe that is the longest life allotted to a meter) one would suppose that all of those meters would expire on that date and be useless, but nothing of the kind occurs; a meter is put in today with a probable life of twenty years or fifteen years or ten years; tomorrow something happens to it; it comes out, and is repaired and another meter is put in; according to our practice of removing meters every five years and testing them and repainting them and putting them back, during the five-year period it will have a new set of diaphragms installed, perhaps the valves will be reground, perhaps a new tangent arm, the stuffing boxes will be repaired, it will be overhauled and painted and the meter put back into use. At the end of the next period the meter will come in and there will

be a defective bottom or plate where it has been sitting on
 364 a damp shelf, the meter will have a new diaphragm installed,
 and other repairs will be made and it will go out into use
 to be used for five years more. Before the days when we considered
 that every meter should be properly tested and cared for and should
 be brought in and tested every five years, meters were allowed to be
 in use for twenty-five or thirty years. I have known in my own
 that was purchased that remained was the little brass tag containing
 experience of cases where the only portion of the original meter
 the name of the meter, the inspector's number and the company
 number. I don't see how you can give a life to the meters when
 they are kept up by repairs and maintenance and also by replace-
 ments—which means that a certain number of meters get beyond
 the economy point to repair them, or they are burned up or some-
 thing like that, and they are replaced, and I don't see how there
 can be any critical moment in a gas company's business when a
 large number of meters must be removed and either destroyed or
 have general repairs. In my experience, repairs and replacements
 are going on continuously and the property is being kept up in
 good condition; and, being so maintained and kept in repair and
 parts replaced, the property has not come to an end in forty-one
 years. I don't know what may happen; I have been through earth-
 quake and fire and all kinds of calamities and it has not
 365 affected my judgment as to the care and condition of gas
 properties.

In my judgment, we might have catastrophies which will destroy
 entire units; but, barring catastrophies and accidents, the property,
 when well maintained and parts replaced as needed, continues to
 exist so far as I can see indefinitely.

"Mr. Bosley: And I think that is the judgment of every man who
 has had anything to do with a gas plant or any other kind of a plant."

The witness continued:

I do not mean to say that the company at no time replaces entire
 meters; or that it always merely takes them out and puts new parts
 in and puts the same meters back. There is a rotation. But the age
 of a meter has nothing to do with it. It is like the mortality of a
 human being. A baby may die at five years of age, or a year, or he
 may live to be ninety-five. The same defects exist in meters that
 cause them to need repairs after they have been in a week, a month
 or five years. I am stating this from my experience with several
 companies. The Pacific Gas and Electric Company does discard
 entire meters. Every year we destroy a certain number of
 366 meters because we find it would be uneconomical to repair
 them. It comes to a point that, if a meter needs too extensive
 repairs, it is cheaper to buy a new meter and replace the old one.
 That is covered in this first line of distribution; I have taken the
 number and the value of meters destroyed because they were con-
 sidered unfit for repair—not unfit for repair when we think of the
 boy's jack-knife, but uneconomical to repair. I can imagine a meter

that has been through fire and has been badly charred and the solder joints have loosened and the diaphragms have been destroyed by the fire, that it would not be considered good practice to repair that meter, it would be much more sensible to replace it by a new meter. For that reason, I have taken the average of the years 1914, 1915 and 1916, of the value of the meters destroyed or brought in as unfit to repair, and it amounts to \$20,619.58.

I think that age has very little to do with the condition of meters that are destroyed. I think that most of the meters that are destroyed are injured by the practice of placing meters in exposed conditions in San Francisco. As you drive along the streets you will see meters on the outside of houses, and in the fog belt, where they are subject to corrosion and where tip-carts may back up against them. Meters are also damaged by fires. They are also damaged by the atmosphere that surrounds them; for instance, meters would not last very
367 long in a pickle factory. All of these matters have more to do with the destruction of our meters than has the matter of age. There is no part of a gas meter that cannot be repaired or replaced if it is considered economical to do it. Meters that are discarded or destroyed may be said to be due to casualties rather than to old age.

I consider Martin Station a standby plant to bridge over the time until we could get our new sets in operation and then it ceased to exist so far as I was concerned as an engineer. I have given it a value of sixty per cent and deducted forty per cent, amounting to \$189,090.30. The reason why that station showed deterioration was that we had a good right to anticipate it never would be used except in an emergency and therefore no money was spent on it. We could read the handwriting on the wall as far back as 1912, when we began to develop oil gas by the new process, that the Martin Station would then be completely abandoned. I considered that, for \$189,090.30, I could take Martin Station and put it back in good condition again. As a matter of fact, the maintenance and repair and replacement of parts had not been kept up to the standard of the other plants of the company. When I say that I could put Martin Station back in
368 good condition again, I mean it would be put back in one hundred per cent condition as far as could be. Of course, you must remember that a plant that has been deliberately neglected is very difficult to get back in one hundred per cent condition. I am anticipating in all my talk here that good housekeeping must follow along the line. You can not neglect a gas works this year and take double care of it next year and keep it in one hundred per cent condition. You must keep it up all the time.

My appraised value of Martin Station is \$472,725.77. That is the actual cost of Martin Station. I had my note book showing what it cost us, outside of the real estate. That item is also contained in my inventory.

Martin Station was built at a time when prices were comparatively low. I found that if I was to appraise Martin Station on the same basis as the Potrero, it would amount to more than \$472,000.00. I happened to have my note books and the cost of Martin Station and

all the details and I simply adopted the cost of the station, which was low, for the basis of the appraisal.

The cost of repairing meters covers actual expenses each year for repairing all defects in our meters in use that are pointed out to us by consumers or through defects that make themselves apparent by a meter breaking down, or stopping, or through the natural
369 rotation of meters by changing consumers, being set and removed and being brought into the shop for repair; taking the average as to 1914, 1915 and 1916, it amounts to \$32,740.68 per year. It seems that that amount of money has kept our meters repaired if we allow the amount of \$20,619.68 for the average amount to cover the value of meters actually destroyed. I think I had better explain how I get these figures. The basis of my calculation to a certain extent rated on certain figures that I was compelled to get from the company's books. I asked Mr. Butler, the auditor of the San Francisco Gas & Electric District, and Mr. Bridges, the general auditor of the Pacific Gas & Electric Company, to furnish me with figures from the books of the company giving me the money expended for these certain things during these different years, and I compared them and made the averages and then added enough to, in my judgment, cover any of these items; the average of the replaced and abandoned meters amounting to \$27,019.58; in putting that in, I lay myself liable to the criticism that why should you add any more when you have already taken the value of meters destroyed and the cost of repairing meters. It seems like duplication. I would prefer to have it seem like duplication in order to have this estimate of mine high enough, (I want it too high—that was my object in getting at this thing) to avoid the criticism of having it low;

370 I want it too much in every one of these items. So, I put \$27,019.58 in "Replaced and Abandoned Meters" as covering that item. That was the highest given me in any year by the Auditor. I did not average; I selected the highest for the three years, 1914, 1915 and 1916. I got my figures from two different sources purposely, that is, from the two auditors, one for the San Francisco District and one for the Pacific Gas and Electric Company. I wanted to get the highest amount paid for replaced and abandoned meters and meters destroyed in any one year. There is really a duplication in those figures which I permitted to exist because I wanted it high. The three estimates which I have provided for deducting are sufficient to fully cover any deferred maintenance because of deterioration or other causes operating to impair the usefulness of the meters at June 30, 1914.

The cost of repairing services averages \$30,337.60 for the three years 1914, 1915 and 1916. I also got a report on the replaced and abandoned services, amounting to \$21,640.83, which was not the average but the highest in any year that was given to me of the three above mentioned years. I feel that that amount of money spent on our services will keep them in practically one hundred per cent condition all the time. A service pipe is a peculiar thing anyway. Of course, the question can be raised that they are steel

pipe, subject to corrosion and liable to become inadequate due to the use of larger gas appliances at all times. That is all very true. When we consider that a service pipe, if it shows any defect at all, that defect becomes evident at once and we replace the service pipe. It then becomes new. There is a rotation going on all the time. If we put in one hundred services today, the life of those services does not terminate at the end of any stated time; one service may die tomorrow. I have in mind now a place where the soil conditions are such that a service pipe would not last a week; that would be the life of that service. When that service is renewed steps are taken to prevent the recurrence of that corrosion (that is, if it is necessary) by applying one of the two methods. The original service is coated with hot asphaltum, a heavy coating of it to prevent corrosion; if the soil conditions are such, we might coat it with our new method of painting the pipe with cold asphaltum, a brush coating, then apply hot asphaltum, wrapping the pipes spirally with burlap and then further coating it with hot asphaltum. That makes the life of the pipe practically indefinite. We use that coating on all the high pressure mains installed today. Or we might put the service pipe in a wooden box, put in hot asphaltum and leave it embedded in the hot asphaltum. That may be done in the case of electrolysis or certain soil conditions. In renewing a service, we try to remedy the cause that made the service have a shorter life than it should have had. In the enlarging of services, where the demands for gas have increased, the demand has not increased in a month but it has been over a long term of years, with ups and downs in the business. I remember when services were one half inch in diameter pipe. Now, we never think of using less than an inch and a quarter for ordinary house services, and from that size up. In all these years there never has been a critical time or moment when we have had to spend a lot of money on services due to corrosion or the death of the service. We have kept our services in excellent condition by this system of repairing and renewing. That is covered by these two items, the cost of repairing services and replaced and abandoned services. In my judgment, that amount of money will keep the services in San Francisco in practically new condition. Of course, the question may be raised, suppose there should be a fuel famine and everybody should use gas for all purposes. Of course, we have to allow for such conditions. If such a condition should exist, these services would take care of a large excess use of gas. The amounts which I have provided for deducting under the heading of "Cost of Repairing Services" and "Replaced and Abandoned Services" are sufficient to cover the deferred maintenance under conditions as they existed at June 30, 1914. The service pipes in the appraisalment which I made are calculated from an actual count of the services, which I asked our company to permit me to make after the fire; I found we were in a badly mixed up condition and did not know how many consumers we had or how many meters or what sizes they were or how many service pipes we had. So, in 1907,

under my direction, there was a census made of the service pipes. This is shown in the appraisalment, the number of services in actual use and the number of dead services due to the effects of the earthquake and other causes. I took the live services and appraised them as a basis on which to get the number of services in use June 30, 1914. Then the books of the company showed the actual installation of new services and their cost after that. Of course, the book cost was not taken in making the appraisalment; that was an estimate of the cost of installing services, covering prices over a period of years, and agreed to by Mr. Ellis, Mr. A. M. Hunt and myself. The appraisalment, as far as I can remember it, discloses the fact that there were only about 46,000 services in that census of 1907 alive that I appraised, and, as I remember it, about 27,000 or 28,000 services dead. Since 1907 to June 30, 1914, the number of services in actual use was increased to about 78,000. Your Honor will be able to gather from that that almost half of the services as of June 30, 1914, had been installed within the preceding seven years.

374 As to old services, wherever there is a demand for increased gas, it is responded to in one of two ways; either by the installation of a larger service pipe, or, preferably, by the addition of another service pipe. If a man is using gas for illumination and for ordinary gas appliances in the kitchen, and sees fit to install a large furnace or house-heating appliance or a large water heater, it is advisable to put in a separate service and give him double protection in his supply of gas and prevent the sudden momentary use of large quantities of gas from affecting the pressure in his house pipe and making his lights "jump", as they say. In that case, we put in an auxiliary service. That, of course, would be a different proposition and not covered here.

The next is a question of mains. The cost of repairing mains is \$45,620.42. That was the average for the years 1914, 1915 and 1916. The replaced and abandoned mains, taking the highest amount given me by the auditor for any one year included in the above three years, was \$104,518.32. I do not include in the highest figure for the three years the instance where the mains that I classified in my inventory as dead mains were written off in one round figure. That amounted, as I remember it, to about \$310,000.00.

375 That was not included in my inventory as live property—it was in red figures. This figure is exclusive of any red figures in my appraisalment. I am speaking of the general rotation and progress of the gas business. It is my opinion that that amount of money will keep our mains in excellent condition.

A cast-iron main properly laid and not interfered with or disturbed by laying sewers or salt water fire systems or by the installation of railroad tracks or other disturbances over which we have no control will last for a long time. Soil conditions do not affect it so seriously as would be the case with steel or wrought iron mains. The basis for the best paint for protecting iron is iron-rust—iron oxide mixed with linseed oil. Cast-iron provides its own protective coating. I have dug up cast-iron mains that have been in use for over thirty

years and I have made breaks and cuts through the pipe and I have found the pipe to be sound under this protective coating of iron-rust on the outside of it; and under the microscope I have found it in just the same condition apparently as new pipe, comparing a new sample pipe with the pipe thirty years old. That is, generally. There are some cases where the iron is affected in some mysterious way so that the iron looks like graphite when it is taken out. I have made all due allowance for that; that happens

376 very seldom; it is not general. Nobody seems to know what happens. It is probably due to impurities in the iron itself, poor iron. I don't think that would amount to a fraction of one per cent of the distributing system; that would be an accident.

It is like an inherent defect in the structure at the time it is produced.

The different causes that will operate on the cast-iron mains and bring about their destruction or their deterioration or the impairment of their usefulness are aggravated soil condition, which will make their effects felt very quickly and which any good engineer would remedy at once, by either changing the location of his pipe or properly protecting the pipe in the ground. That would be a very small percentage of the distribution system. When that condition exists, it is likely to develop early. It would develop in a new system. If developed and ascertained and a proper remedy applied, it would be relieved from that risk from that time forward. Another condition that operates, besides soil conditions, to bring about deterioration in the cast-iron pipe is electrolysis, which has damaged some of our mains. In the early days of electrolysis, I felt there was more damage done to the fuel bills of the electric company that loses the tramp current than there was to the gas company's property and they would apply the remedy. That has been the result.

377 The loss of electricity, or what is known as tramp current, is so great that the railroad companies and the electric companies are taking measures to prevent the loss of this current. That has reduced electrolysis and is reducing it every day to what might be called a negligible amount. We still have some cases of electrolysis. With respect to the susceptibility to the action of electricity in producing electrolysis in the case of cast-iron pipe which is new and cast-iron pipe which has been in the ground and has acquired a coating of rust such as I have referred to, it is my opinion that the protective coating of the iron rust would be a poorer conductor of electricity than the new metal of the new pipe; that is, an old pipe would be just as safe and perhaps a wee bit safer than a new pipe. That is, electrolysis would be at least as likely to happen or to occur in the case of a new pipe as in the case of an old pipe. When it does happen, it brings about an apparent deterioration; that is, electrolysis will act locally on a pipe and cause a leakage of gas which will make itself known and it becomes easy to repair the damage and prevent the recurrence of it either by intelligent bonding or by having the railroad company or the offending company do the bonding of its rails, or by further protection of the pipe, as was the case on Geary Street opposite the new Municipal

378 Railroad power house, where we had an eight inch steel high pressure line laid and, anticipating electrolysis, we laid the pipe in a wooden box entirely filled with hot asphalt and it solidified around the pipe, filled the box and protected the pipe from electrolysis. That, with bonding, protected the pipe; otherwise, the pipe would have been eaten out about once a week.

When there is electrolysis, the gas pipe acts as a return conductor of electricity to the power-house—what we call tramp currents; where the positive electricity enters the pipe there is a deposition of salts on the metal, that is, a hydrogen condition; the word “electrolysis” arose from the fact that the effect of electricity is the electrolytic disassociation of water into its constituents, hydrogen and oxygen— H_2O . Where the tramp current enters the pipe, it is a positive or hydrogen condition; there is a deposition of a little wet salt at the point where the electricity enters; but that electricity must leave the pipe at some point because it is on its way back to the generator where it gathered. Where the electricity leaves the pipe, which is at some convenient point near or in contact to a larger conductor, or to the company's rails, or something that is a better conductor, there there is an oxygen condition and the oxygen sets up an active corrosion of the metal of the pipe where it leaves
379 the pipe on the outside; the oxygen comes from the moisture in the soil. I believe electrolysis would be impossible in an absolutely dehydrated condition of soil, but that never occurs; there is always more or less moisture. The electricity in leaving the pipe, commences to decompose the water in the soil, the hydrogen goes with the current but the oxygen remains. Pure oxygen will corrode iron very quickly; it almost eats it up. Where the current leaves the pipe, the oxygen on the outside has rusted the pipe until in a very short time it eats it through; it corrodes to the inside. Then there is a leakage of gas, and we dig down and find it and remedy it. Of course, you must separate that in your mind from any fusion of metal by an electric current; that happens sometimes on a bad grounding where electricity will fuse an underground gas pipe and burn holes in it. I have seen that happen. That is not electrolysis. The electric action, whenever it occurs, occurs in a comparatively short time and makes itself known in causing an escape of gas so that you can ascertain the source and make a repair or a replacement. I look upon it as one of the accidents of the business.

Another cause that acts on cast-iron pipe is the growth of the business. That is what might be called inadequacy. I notice
380 in the life tables different people give different probable lives to large size pipe; that is, a twenty-four and a thirty-six inch pipe as one probable life, and a four inch pipe as quite another one, a shorter one. That I have had explained to me as being caused by the danger of inadequacy of the smaller pipe. As a practical gas man I believe all of the pipes are usable and are indefinitely useful and valuable to a gas company until you get down to a size of pipe where there is a structural weakness in the pipe itself; for instance, in the early days of the gas business it was customary to put in a two inch cast-iron pipe. A two inch cast-iron pipe had

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hardly strength enough to sustain its own weight if suspended between two points nine feet apart. It was not wise to use two inch gas pipes. The same feeling exists as to a three inch pipe, only to a lesser degree. Many years ago it was determined by a gas company in the East that a four inch pipe was about the smallest diameter pipe that could be used when we consider the earth strains of frost going in and coming out of the ground and the jars from heavy traffic. Therefore, four inch pipe I consider the base size. There is no reason under the sun why a four inch pipe should not last just as long as a twenty-four or a thirty inch pipe. As to its usefulness, the custom has not been to remove large quantities of four inch pipe

and replace them with other sizes but to properly tie in a
381 district so that the streets would look like a grid-iron properly tied together; when it needs reinforcing, run a feeder through it and another one at right angles or loop around it so that the usefulness and value of the small pipes may be kept up to one hundred per cent by proper feeding indefinitely. That has been the practice in gas companies all over the United States. The maps show it.

I have inventoried the pipe in our system that is less than four inches. I found in use in San Francisco 274,791 feet of three inch cast-iron pipe valued at \$175,811.28 plus the ten per cent overhead. There is nothing smaller than three inch cast-iron included in the inventory either under live or dead mains. I find that nearly all of the three inch cast-iron main is included in certain well defined districts in the city, south of 14th Street, north of 26th Street, west of Folsom, east of Castro, and in the portion of the city bounded by Larkin, Broderick, Grove and Vallejo. I am not sure whether much of the duplication of mains was found in these districts, but I am sure that some of the duplication covered three inch mains; that is, some of what Mr. Ellis calls duplicated mains covers three
inch mains. I believe that a three inch main is considered

382 structurally weak in frost countries where the ground will become frozen to the depth and below the depth of the main and at certain times in the winter will thaw from the bottom and take hold of the frost and the reaction has a tendency to break the mains. That was the main reason for abolishing small size cast-iron mains in the East and we followed the practice out here although we have no frost in this country to interfere with our mains. Granted that we have this amount of three inch cast-iron pipe—and we shall never lay any more three inch cast-iron pipe—I believe that the maintenance and the repairs included in my estimate cover the proper maintenance and upkeep of the three inch cast-iron mains which we have in use. I also believe that the maintenance and upkeep of the small amount of three inch cast-iron main which we have in use is not disproportionately large. My attention has never been called to many broken three inch cast-iron mains. Should there be a break in such a main, the leakage of gas would make itself known and it would be repaired in every way similar to the repair of a larger main. So that, while we have that amount of three inch main, I believe it is useful and valuable to the company as I

have appraised it in the inventory, although we would not put in any more cast-iron main as small as that.

383 The two inch cast-iron main has evidently eliminated itself; that has been displaced by larger mains.

My opinion with reference to the effect of the earthquake disturbances upon the cast-iron main is that the main, as it is laid, depends entirely for any resilience or elasticity of movement on the lead-joint. At each twelve foot length there is a bell and socket and molten lead is poured into the joint and it is caulked until it is gas tight. That allows a small movement either laterally or up and down but not enough movement for the sudden shocks of earthquake. So that our total damage by earthquake was to cast-iron mains. We had no leaks and no breaks on any of our wrought iron or steel mains due to the earthquake. The steel tubing from San Francisco to Redwood City was practically undisturbed; there was no leakage whatever on it, and that passes through a territory that was severely affected by the earthquake. Our high pressure main from Santa Rosa to Petaluma, nearly seventeen miles long, was unaffected by the earthquake, and Santa Rosa was one of the centers of the disturbance.

The effect of the earthquake on the cast-iron main resulted in breakage. As nearly as I can remember, there were over forty-five hundred actual breaks in cast-iron mains. Those were repaired

384 by either replacing lengths of pipe or repairing the break with clamps, as is usual. Wherever service connections were made to the main with what is known as street-elbows, oftentimes the services were sheared off where they enter the main and it was necessary to repair that. We succeeded, at a good deal of expense, in almost overhauling the distribution system in San Francisco. It meant recaulking joints, repairing broken mains and a general inspection of all of our mains of the system which included nearly 700 miles of pipe. It placed it in excellent condition, as nearly perfect as we could get it. Then came our large leakage. Of course, it might be maintained that the measure of value of a gas distribution system might be the loss of gas by leakage.

That would be true under certain conditions of normal pressure, and the absence of disturbances by earthquake and other things beyond human control. After the earthquake we had excessively high leakage of gas in San Francisco. That meant we had to spend a great deal of money in searching out the sources of these leaks and repairing them. We have done that. The consistent and uniform lowering of the leakage in San Francisco since 1906 is proof to me that our distribution system is in better condition every day and is getting better every day. We are reducing the leakage both in per cent and in loss of gas per mile of main. By the means we are employing and by finding and stopping leaks and getting the

385 system in a tight condition our leakage is going to diminish.

But, comparing the leakage today in San Francisco with other cities in the country, the leakage today is not very high.

I had occasion the other day to look at a Government publication which was sent to me, which is headed "Artificial Gas and By-products

in 1915, issued by the United States Geological Survey, Department of the Interior," and was written by C. E. Lescher, published March 20, 1917, and is marked II,XXXV. I think this bulletin will be of interest in connection with the question of leakage as it relates to and affects the present condition of the distribution system. In this publication, they determined the average percentage of loss of gas in different states with different kinds of gas. It seems to me that it is, in a way, a measure of the condition of the system, everything considered. From this report the coal gas plants in the United States are listed under "States" and the leakage is given as a percentage of the loss average of each state. The leakage in Alabama in 1915 was 23.9%. In California, New Mexico and Wyoming it was 18.1%.

This is an average of the companies in those three states, California, New Mexico and Wyoming. Colorado, 10.2. Connecticut, 4.8. Delaware, Florida, South Carolina, Vermont and West 386 Virginia, 11.6. The District of Columbia and Maryland, 16.3. Georgia, 6.5. Idaho, 7. Illinois, 8.5. Indiana, 9.8. Iowa, 9.3. Kansas, North Dakota and South Dakota, 11.5. Kentucky, 16.5. Louisiana and Texas, 13.6. Maine, 12.7. Massachusetts, 5.4. Michigan, 8. Minnesota, 6.1. Mississippi, 18 plus. Missouri, 5.5. Montana, 16.5. New Hampshire, 9.1. New Jersey, 7.8. New York, 3.7. North Carolina, 13.4. Ohio, 11.1.

As compared with that, the leakage in San Francisco, for the first day after the gas was first turned into the city after the earthquake (it was turned into the city on May 12), was, I think, something over eighty per cent. For the month of June it was 34.33; it continued higher and lower through the year until the average for the year was 38.76. This was the average for the months in 1906 following the earthquake. I lost track of it for January, February and March. The average was 11.55 for the year 1905; it ranged back around 10 and 11 for the years preceding that.

The leakage for the years 1906 to March, 1913, was estimated by estimating the plant output of gas from the amount of oil used and the estimated efficiency of the machines as compared with the registered gas by consumers' meters. We didn't have station meters 387 to compare it with and we were in such a position that we could not afford to buy the station meters. When we did get the station meters, they were put in commission in March, 1913.

With those facts in mind, I will read the average annual leakage; that is, the percentage of the total gas made and not the average of the twelve months.

For 1907 it was 28.79; for 1908 it was 19.24; for 1909 it was 15.18; for 1910 it was 14.14; for 1911 it was 13.13; and for 1912 it was 10.26. Then in 1913 we had an actual measurement of our gas by station meters. In 1913 it was 10.29; for 1914 it was 14.56; for 1915 it was 16.92 and for 1916 it was 11.41.

To demonstrate my good faith in saying that this is consistently and uniformly reducing, the work that we have been doing on our street mains with regular crews in hunting out and repairing leaks

has been bearing fruit. We have been repairing our mains and getting them in shape, and adjusting pressures and in the meantime keeping the service good.

I would like to read the leakages by months from January, 1916, to date:

In January, 1916, the leakage was 17.45; in February the leakage was 16.89; in March the leakage was 15.57; in April the leakage was 13.64; in May the leakage was 11.95; in June the leakage was 8.97; in July the leakage was 9.39; in August the leakage was 12.87; in September the leakage was 4.93; in October the leakage was 8.57; in November the leakage was 5.1; and in December, 1916, the leakage was 9.72. The average was 11.41.

That shows zeal and a purpose to eliminate leakage and to get our system in better condition.

For the year 1917 it was as follows:

In January, 1917, the leakage was 8.13; in February the leakage was 12.17; in March the leakage was 11.04; and in April, 1917, the leakage was 10.8.

It is quite contrary to the usual practice for the leakage in the summer months to be lower than the winter months. In the summer months the percentage leakage should be much higher than in the winter months because the percentage is based in the winter months on a very much larger output of gas. In our case, in 1916 the leakage diminished in the summertime due to the work we were doing on our street mains, the efforts we were making to reduce the leakage. I think it may be taken as conclusive that a leakage of 11.41, with the troubles and the difficulties we have had in San Francisco with our distributing system, compared with an average of the leakage of coal gas companies* of the States of California,

New Mexico and Wyoming, of 18.1, is not considered bad, and particularly when we consider that there is only one little coal gas company in the State of California, at Jackson, in Amador County, and that these other coal gas companies are in the other states mentioned. So that to bring out all of the facts we must consider coal gas and water gas produced and consumed in the United States in 1915; in the State of California, listed separately, of sixty-four companies, the average leakage in 1915 was 13.1%.

Our leakage in 1915 was 16.92. The way to get the percentage of an annual leakage is to take the total amount of gas made and the total amount accounted for during the entire year and subtract one from the other and establish a percentage of the difference to the amount made. If you get that percentage by taking the leakage every month in the year and then, adding up the twelve months and dividing, you don't get average for the year.

The data that I have are made from the station records, checked by the auditor's figures coming back to me, and the auditor's report to me of accounted-for-gas; that is, gas consumed and otherwise accounted for. It involves the comparison of two records, one the station record showing the amount manufactured and the other the

accounts from the auditor's office showing the gas reported as sold to consumers. This matter is so vital to me that I don't
390 permit any errors to creep into it if I can help it; it is the compass I steer my ship by.

The amount of gas sold to San Francisco for street lighting purposes is ascertained by a computation based on an assumption of 3.6 cubic feet of gas per hour for the Wellsbach street lamps. The number of burning hours was taken from the regular street lighting schedule as laid down by and agreed to by the city. That gives us the amount of gas actually charged to the city. It does not represent the amount of gas that passes through the street lamps. With a four inch water pressure those burners should burn about 3.6 cubic feet of gas per hour; but we have hills in San Francisco with a height, I believe, of three hundred and fifty feet which would add three and one half inches to the normal valley pressure and would practically double the consumption of gas by street lamps. So it is impossible for us to tell how much the street lamps are burning except to say that we know they are burning in excess of 3.6 cubic feet per hour charged the city.

The city does not pay by the cubic feet, it pays by the lamp night. There is an element of uncertainty in determining just what the percentage of leakage is which amounts to hundreds of thousands of cubic feet per year; I have felt that the street
391 lighting of the city is good. I have felt that all gas used to secure full incandescence of the mantles was well used in giving good service to the city, and that it was worth whatever gas was necessary to bring it about.

There is only a small element of uncertainty in the length of time a lamp is lighted. The routes are divided up so that it is convenient and easy for a lighter to light and to extinguish a certain number of lamps in an hour. There used to be about seventy lamps on a route. The lighter begins at the same point on his route every night and proceeds at about the same rate of speed—after awhile he gets his gait—so that the last lamp on his route is lighted exactly sixty minutes after he lights the first one. And he puts them out in the same way. The routes are worked on a card system. They are carefully watched to see that they do light and that they do extinguish just in one hour. The total time is taken from a point halfway between the starting and the stopping of the lamp-lighter. I have nothing with me by which I can state the amount of gas that is charged on the books as having been used for street lighting purposes in San Francisco, but, if my memory serves me correctly, it is 3.6 cubic feet of gas per hour that we have allotted. I have not the figures showing the total annual sale. It would be necessary
392 for me to get that information from some other source; it could not be my own.

"Mr. Bosley: I expect to produce that in another connection. I thought Mr. Jones might have a memorandum as to just what it was. I will introduce the statement later showing the amount of gas charged as having been furnished for street light-

ing purposes, and the amounts appearing on the records to have been furnished to other large consumers and the amounts shown to have been furnished to those who under the existing schedule pay seventy-five cents per thousand cubic feet or more."

The witness continued:

The pressure of gas used with cast-iron mains twelve feet long and with lead joints cannot exceed two pounds safely. The four inch pressure I spoke of, when reduced to weight, is about one seventh of a pound. The cast-iron mains with lead joints are intended for low pressures, and it would not be safe to use more than a pressure of two pounds to the square inch, nor would it be economical, although I have known of five pounds being applied to them, but probably with great loss of gas. I have never known of a case where mains have been proven to have been broken by traffic. When the city undertook to break the pavement on Van Ness Avenue by using

393 a pile-driver with a knife on the edge of the hammer, raising it up and dropping it, nearly every time they dropped it it broke a gas pipe or ripped a service out of a cast-iron main. We had to rehabilitate the whole length of Van Ness Avenue, to recaulk every joint and make some replacements. Accidents of that kind are as apt to happen with new pipes as with old ones.

Deterioration or defects produced by these accidental happenings have to be replaced or repaired from time to time whenever they happen, and they are just as apt to happen with an entirely new distribution system as with an old one. If it is a serious leak it makes itself known. That is the easiest leak to fix. It is not of long duration and the loss is not much. We dig down and repair the part. If the leakage is general, it shows in the monthly leakage of the gas account and then it means a general inspection of the entire district, which is slow and expensive and discouraging. That is what we have been doing since 1906, and we are right in the midst of it now. We are not through with it by any means. It was caused by something over which we had no control. Where the leakage is in old joints, it means barring with a steel bar through expensive pavements to a point above the lead joint and ascertaining if there is a leakage of gas at that point. It is expensive and tedious work. We have gone over this city in that way. I

394 do not know of any other causes that result in deterioration of the cast-iron mains than those I have already mentioned.

In my opinion, the amounts in the two items "Cost of Repairing Mains, \$45,620.42" and "Replaced and Abandoned Mains, Highest in any Year, \$104,518.32" were sufficient at June 30, 1914, to provide for any deferred maintenance or to make any replacements which probably were required at that time.

The valves and other parts of the distributing system used in connection with cast-iron mains are governed by the same principles that are applicable to the mains themselves. They have an indeterminate life. A valve may need slight repairs or packing. That is attended to and the valves are kept in good condition. The other fittings are similar in every way to the pipe itself except that they

are heavier castings, and, if weight has anything to do with life, then they are more durable.

In connection with the subject of wrought iron mains, first the low pressure and then the high pressure, I wish to call attention to the fact that wrought iron mains are really steel mains. It is practically impossible to purchase wrought iron pipe today, and it has been for many years. Believing that a cast iron system, well
395 cared for and maintained with proper replacements, should remain in one hundred per cent. condition and value, I was compelled to consider the question of the deterioration of steel pipes in the ground.

The size of the wrought iron mains varies from two inches up to sixteen inches. The low pressure mains are listed from half an inch up to three inches. They are all listed on page 271, Volume 4 of plaintiff's Exhibit No. 3.

With reference to the low pressure mains alive, on page 273, volume 4 of plaintiff's Exhibit No. 3, the high pressure wrought iron mains are listed as from one and one quarter inch to sixteen inches. Wrought iron is the trade name under which they came. They are indicated in the books as "W. I.," meaning wrought iron.

Recognizing the fact that a life should be given to some of the wrought iron mains, low pressure and high pressure, now in use, from the fact that, during the early days of high pressure distribution, little was known about the protection of pipe, from my experience with high pressure mains in Grass Valley and Nevada City, Petaluma, Santa Rosa, Fresno and other cities, I feel that a wrought iron pipe, which has simply a coating of paint, whether it be linseed oil and some pigment, or hot asphalt, must be
396 given a life, and must be considered as deteriorating. At present, we coat our steel high pressure mains, as I described before, with a cold coat of asphalt paint and then a hot coat of asphalt, then they are wrapped with burlap strips and the whole is thickly coated with hot asphalt and they are covered, joints and all. We use welded joints. It is practically a jointless length of main, coated from end to end in the way I have described. No one knows how long it will last. I believe it has a very long life. These mains described in the inventory were not all so coated. What I have said would apply to both low and high pressure mains with the exception of a relatively small quantity of high pressure mains in small sizes in the southern part of the city south of what is called the Viaduct which were put in shortly after 1903 when there was a general movement of small homeseekers to that part of the country to get out of the city. They had to have some place to live, and they went down there, and we supplied them with high pressure gas through two inch tubing. That was laid subsequent to 1906. But the real high pressure system of the city, beginning with the sixteen
inche loop which extends from the Potrero Gas Works through Army Street, and through the Mission and crossing Market Street
397 at Webster and going north on Webster to Bay and extending through Bay Street to the Metropolitan Station, was laid in the latter part of 1910; as I remember it, it was finished about October, 1910. The large feeders, eight inch pipe principally, lead-

ing out into Richmond and Parkside and Sunset for the supply of those districts were laid subsequent to that; that is, most of them were laid in 1912. Those mains in 1914 were not quite four years old, although I have given them an average age of four years. I felt it was just to subtract \$86,502.33 from the valuation of the low pressure mains, wrought iron, and \$72,944.61 from my estimated value of the high pressure wrought iron and steel mains; but I would not feel like making that deduction if these same mains were coated as we protect the pipe today, the same kind of pipe.

The practice of coating and protecting the wrought iron mains in the manner described has been developing in the last four or five years. We found that, in order to avail ourselves of the protection of any coating, we must diligently see to it that every part of the pipe is coated, that there should be no small part of the joint or any holidays uncoated on the pipe. So we know that every portion of that pipe has been conscientiously treated. And having been so, I am unable to say how long that pipe will last, any more than
398 I could prophecy the condition of an Egyptian mummy after 5,000 years; it is practically a mummifying of the metal.

With respect to the mains that I have depreciated, I assume a twenty year life as the basis for obtaining the results, based on experience with the mains I have mentioned, particularly the Santa Rosa-Petaluma mains, and mains in those districts of adobe and sand soils where I could draw comparisons between conditions there and conditions in San Francisco. I wanted to try and find out about how long they would last.

I have good reason to believe, that these mains are in better condition than I have estimated here. If you were to ask me the condition of the sixteen inch line looping the city, which is the most expensive installation we have, I would say that so far as I know it is in perfect condition, because I have had the main stripped several times, and it shows no wear; it shows itself to be in good condition. The joints were made with what is known as Dresser couplings having rubber gaskets. The fault of those couplings and all other couplings that make use of rubber as a jointing material is that the hydro carbons of the gas will soften and eventually rot the rubber, so that the rubber loses its elasticity and life and ceases to be a jointing material. To avoid that, we soaked all the
399 rubber gaskets on the sixteen inch line in orange shellac, and we coated the iron faces of the couplings with shellac and screwed the joint up while it was moist. A joint made that way and let alone, avails itself of the elasticity of the rubber, and the shellac sets on it and it makes practically a glass joint. I have gone over many of those joints and I find they do not leak.

I hope I am — wrong about giving that main a twenty-year life; it is now seven years old, without showing any signs of failure.

That makes a total of \$828,916.41 that I would tell this prospective purchaser should be spent to bring this property up to what I consider the one hundred per cent. mark throughout that year; that is, so that he would have the full value of his property.

Calculated on the total appraisalment of \$13,066,201.55, it amounts

to 6.3%, leaving, in my opinion, a present value as of June 30, 1914, of 93.7%. This is taking the value exactly as it was given in my inventory, and before the application of overhead. The figure of \$13,066,201.55 is on page 2. It includes my ten per cent. overhead, but not the additional overhead that was figured by Mr. Vincent.

400 I couldn't include overhead in repair cost and operating expenses and that sort of thing; the repairs, and the maintenance and the cost of rechecking the old sets, and the painting of the gas holders, is all actual cost, money paid out. We get to an overhead when I have taken items from the inventory and have listed those items. Now, take the old generator building, and the dredging of the channel; there, there is no overhead; lamp black, separator, repairs to Browning hoist, no overhead. I am not sure whether there is an overhead in abandoned separator and hoist in front of generator house. In figuring the percentage at the end, it will be noticed that the amount given as the value is the amount that is contained at the end of Volume 4 of Exhibit No. 3, after making the deductions that were agreed upon with counsel for the defendant. I feel that overhead is included in some of these items of machinery and the items as a whole. In some of those cases I went to my appraisal and took the figures out bodily, and I was not thinking of overhead at the time. All of these repairs, and my estimate as to how much it would cost to put this part of the plant in order, or that part of the plant in order, I didn't consider overhead at all; or in the repairs or replacements or abandonments, and all that sort of thing, mains, services and meters, there is no over-

401 head included in that. If it is a matter of importance, we could comb out whatever overhead happens to be in this. It would make it even less and it would make the percentage of present value higher. I did not attempt to make it high just to keep it high. It amounts to 93.7%, which is my opinion of the present value of the plant as it is kept; that is to say, if \$828,000.00 were spent, that would make it as good as new. You might consider that you had a new system, a new gas works, ready to go into the business and make gas and make money; and then, applying that amount that I have claimed is necessary each year in repairs and replacements to the keeping of the plant in one hundred per cent. condition, and with proper housekeeping, you would always have a one hundred per cent. plant; that is, the amounts that have been expended, and that have been shown by practice to be adequate. I do not mean \$828,000.00 each year; we wouldn't depreciate Martion Station every year. It is only that part that applies to meters, and services, and mains, and the upkeep of the generating plant.

"Mr. Bosley: Q. As I understand it, this is your estimate of the amount of deferred maintenance and replacements as of June 30, 1914, that is, if that amount had been expended at that time in making repairs and making replacements, the plant would
402 have been restored to its full one hundred per cent. physical condition?"

A. I think I would put it a little differently. I would not make it an interrogation. The money has been spent and it is in that condition. There is no supposition about it. We have spent that sum of money, and it is in that condition today. At any moment of time there is some deferred maintenance, and what I have attempted to do here now is to give my estimate of the pecuniary value, or the cost of making all replacements and repairs that would be necessary to remedy that deferred maintenance; in other words, if I could bring all of my deferred maintenance and replacement right up to date, the expenditure would only be this amount.

There was thereupon admitted in evidence and marked plaintiff's Exhibit No. 43 a statement a true copy of which is as follows:

Appraisalment of Gas Properties, San Francisco, Accrued Deterioration, Expected Abandonments, and Replacements as of June 30th, 1914.

Potrero Station.

Berth for Vessels at Wharf, Redredging required every three years, cost \$2,400, was dredged 1913.....	\$800.00
Old Generator Building, Repairs to End Wall.....	3,500.00
Lampblack Separator, One Browning Hoist repairs..	7,500.00
Abandoned Separator and Hoist in front of Generator House	4,793.53
Oliver Filter, Cummer Dryer and Briquetting Press..	38,981.53
Lampblack Shed abandoned	3,172.31
Sterling Boiler Room, Two B. & W., One Heine Boilers, Value 40%	7,816.06
Total Carried Forward	\$66,563.43
403 Amount brought forward	\$66,563.43

Potrero Station—Continued.

500,000 ft. Relief Holder, repairs.....	11,868.45
Mackenzie Exhauster, Engine and Foundation, Value 50%	1,391.50
Purifying House, Repairs to Hydraulic Hoist.....	200.00
Salt Water Pump House, portion abandoned.....	275.00
Water Tanks, abandoned, piping retained value 20%	2,757.04
Oil Storage Tank, abandoned.....	2,143.05

Independent Station.

2—100 H. P. Return Tubular Boilers, value 20%..	2,112.00
Measuring Tanks, repairs	125.00

Metropolitan Station.

200,000 ft. Relief Holder, one section abandoned....	6,792.77
Meter House Destroyed by wind storm.....	1,829.71
Auxiliary Exhauster House, abandoned value 20%..	4,780.92

North Beach Station.

1—No. 10 Sturtevant Exhauster, removed.....	1,316.00
Counter Shafting abandoned	53.63

General.

Cost of Painting Gas Holders in San Francisco....	12,308.20
Cost of Re-checkering 4 old sets, Potrero.....	8,365.36
Maintenance and Up-Keep of all Generating Plants..	75,000.00

Martin Station.

Appraised Value \$472,725.77, Depreciated value 60%, deduct 40%	189,090.30
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Distribution.

Value of Meters Destroyed average 1914-1915-1916..	20,619.68
Cost of Repairing Meters " " " " ..	32,740.68
Cost of Repairing Services " " " " ..	30,337.60
Cost of Repairing Mains " " " " ..	45,620.42
Replaced and abandoned Mains (highest in any year)	104,518.32
Replaced and abandoned Services " " " " ..	21,640.83
Replaced and abandoned Meters " " " " ..	27,019.58
Low Pressure Wrought Iron Mains in use \$288,341.11, Average Age 6 years, value 70%, deduct 30% of value	86,502.33

Total Carried Forward	\$755,971.80
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401

Distribution—Continued.

Amount brought forward	\$755,971.80
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High Pressure Wrought Iron and Steel Mains in use \$364,723.09, Average age 4 years, value 80%, de- duct 20%	72,944.61
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Total	\$828,916.41
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Total Appraisalment, \$13,066,201.55; \$828,915.41 = 6.3%, leav-
ing a present value of 93.7%.

The witness continued:

My experience with the company's generating units in San Francisco, with reference to their efficiency at the time when they were first installed, and during the period of their subsequent use, shows that, with the exception of the Independent Station, which is so-called water gas, the other generators are intended for the manufacture of oil gas. The process of manufacturing oil gas has been in a developmental stage, practically, since 1902. But in 1912 the experiment had reached such a point that we began to see new light in the oil gas business, and to find out something about the proper treatment of petroleum or its distillates for the manufacture of gas. The development of what is now known as the new process, started at the Metropolitan Gas Works at a time when the total capacity of the plant was 1,500,000 cubic feet in twenty-four hours; to make this quantity of gas, it was necessary to use two fifteen
405 foot oil gas generators and supplement them by the use of what was known as a Lowe coke oven. When we took charge of the property and began improvements, we very shortly stopped the use of the coke ovens, in fact immediately stopped the use of the coke ovens and made the necessary amount of gas in the two fifteen foot sets. When I say "necessary" I mean the amount of business that had been developed along the mains of the Metropolitan Light & Power Company due to its efforts to sell gas. We began immediately to tie the mains of the Metropolitan and the other companies together so that the Metropolitan system became a part of the entire system. That permitted us to make and distribute more gas at the Metropolitan Station. We began an improvement of the generators and in a very short time we had doubled the capacity of the two fifteen foot sets so that each fifteen foot set would produce 1,500,000 cubic feet a day. The development work was continued at the Metropolitan without increasing the diameter of the generating units. We made changes in the length of the shells and improvement in the process of making gas until now the plant has a capacity of between 7,000,000 and 8,000,000 cubic feet in twenty-four hours, using the two fifteen foot sets, a set including a primary and a secondary generator. With certain additions they are the same generators we purchased in 1911. We developed this new process and put it into operation at the Metropolitan plant during a
406 portion of the year 1912 and thereafter.

Patents for our apparatus invention and process invention were applied for that year in the name of E. C. and L. B. Jones. We commenced the construction of the two new Jones sets sometime in the summer of 1914 and one of them was brought into operation in the beginning of May and the other in the beginning of July, 1915, at the Potrero Station. The result of my experience in the operation of the new Jones sets at the Potrero, so far as it relates to their efficiency in the generation of gas, is shown by a report taken from our regular books at the Potrero. This report shows the amount of gas made each day with each set during the months of May, June, July, August and September, 1915, showing the devel-

opment of increased capacity by close study and by daily improvement in gas making methods by a new process. What is known as No. 5 generator was started on the 3rd day of May, 1915; the amount of gas made from May 3 to May 10 was so erratic that no record was made of it as coming from the set. It was much one day and little the next. On May 10 we began keeping regular account of the amount of gas made. On May 10 this generator produced 1,377,000 cubic feet of gas. Two changes were made that day; and the day following, May 11, we produced 1,548,000 cubic feet of gas. Due to

some slip on the 12th it was only possible to make 987,000
407 cubic feet; evidently some work was done in the way of applying knowledge that was being gained from hour to hour, so that on the 13th there were 1,638,000 cubic feet. On the 14th it dropped back to 1,082,000 cubic feet. On the 15th it more than doubled up, 2,321,000 cubic feet. On the 16th it was 2,787,000 cubic feet. On the 17th it was 2,628,000 cubic feet. And so on up to the 20th of May. On the 20th we turned out 2,926,000 cubic feet. Then, during the early part of June, we changed our operations. We were learning all the while how to make oil gas in this new way; on the 21st of June I have a record of 3,795,000 cubic feet turned out by No. 5. On the 22nd of June we made 4,596,000 cubic feet; and so on up and down until on the 27th of June we made 6,065,000 cubic feet. Then we kept on experimenting with superheated steam and a careful measurement of the quantity of steam needed, and the temperatures of the checker bricks, and a thousand and one other things, and the results got down as low as 2,200,000 cubic feet and up as high as 5,590,000 cubic feet, until the month of September, when on the 11th of September we reached 6,294,000 cubic feet. From then on to the present day there has been no difficulty in producing 6,000,000 feet a day any day we want to do it. For instance, in the month of September the lowest made was 4,734,000 cubic feet on this machine and the highest was 6,294,000 cubic feet. It only goes below 5,000,000 on three
408 days. In the latter part of September, on the 27th, we made 6,101,000; on the 28th, it was 6,077,000; on the 29th it was 6,077,000; on the 30th it was 5,357,000, which probably was a Sunday when there was less gas required. The machine at that time had established its gait; we got it to a basis of 6,000,000 feet any day that we cared to make it, and 5,000,000 feet day in and day out throughout the year; it became a five million foot machine, with a safety factor of 1,000,000.

Practically the same thing happened to No. 6 when it was started on the 4th of July. There is no record of gas made until the 7th of July; here is a foot-note which says: "Prior to May 10 considerable trouble was experienced in the operation of the Venturi Meter and no reliable record of the individual machine was at hand." The same thing took place again in July, 1915; the make of No. 6 was not kept separate until the machine was put on the line in running condition. On the 7th of July, we made 1,903,000. With the knowledge gained on No. 5, though, on the next day we made 3,495,000. Then the record shows the results of experiments in try-

ing new ways of operating—no two generators are exactly alike—until along in September when we got No. 6 up to 5,678,000. It remains there. It is a six million foot machine any day we want to make it, and always a five million foot machine.

409 I have gone into this lengthy description to show that had we not had the patience and applied the study to the development of even these new machines, we might have been satisfied with a daily capacity of 1,500,000 feet as to each one of them and let it go at that; but by development work and by study and by not being satisfied, and having a mark to shoot at, we have practically increased the capacity four times; that is, we have made a six million foot set out of what at the very beginning appeared to be a million and a half set. Under some conditions it would have been allowed to drag along as a million and a half set.

The capacity of a single set of the old Jones sets at the Potrero has been forced to 3,000,000 cubic feet a day. I started out with the idea that they would be four million foot machines but we could not get 4,000,000 feet of gas out of them. For some period of time we got 3,000,000 feet out of them. I found they were rather erratic in their operations and so it was safer in making a statement as to how machines would turn out to rate them at 2,500,000 feet a day, because I felt we could always do that day in and day out.

There has been an improvement in efficiency in the operation of the new Jones sets since September 1915. The improvements have not yet stopped. We are going on with the experimental work, trying to find out more about oil gas.

410 Additional expenditures have been made in connection with the two new Jones sets during this period of their experimental operation and since then, but such additions would be included in operating expenses; that is, we have made several changes in the operating of the machines, requiring changes of small parts, but we do not consider that an addition to the plant. We have never expended any substantial sum in bringing these machines up from their initial capacity to their present capacity. It has been a matter of hard work. We found that the machines knew more than we did when we got busy with them, that they were beyond us, and we had to study the machines themselves; the machines were better than the operators. It kept us busy to find out the merits of the new machine, to get its capacity out of it. It never has failed us. It has been better than the operator all the time. It is like a Steinway piano; a man, no matter how long he studies, can get satisfactory music out of it; if he starts in with a cheap tin-pan piano after awhile he has to get a better instrument. These machines make more gas and better gas as we acquire the knowledge of operating them—and we are not through with them yet.

The increased efficiency since these machines were started in 1915 is not represented to any considerable extent in any increased appraised value or cost of these machines. I cannot see, in the

411 light of the oil gas work that has been done in other places where machines of twenty feet in diameter have only a capacity of 2,000,000 feet in twenty-four hours, and comparing them

with these machines which are only eighteen feet nine inches in diameter and have an every-day capacity of 5,000,000 feet, why the new machine with its greater capacity, amounting to two and a half times these others that are satisfactory to the owners and operators and rate-making bodies, should not have a value in excess of what I have put on them in the appraisement; that is, if a twenty foot machine of one type will only make 2,000,000 feet of gas in twenty-four hours and a smaller machine of another type makes five million feet in twenty-four hours, with practically the same cost to install, it seems to me there is an essential element in the larger capacity machine which should be considered by an appraiser. I don't know how to do it. I would not care to appraise a machine on its capacity, but nevertheless I believe that it has an essential value that is not expressed either in cents per pound of steel, or in fire brick at so many dollars per thousand, any more than you could say that a pound of pig-iron is worth half a cent, or a cent, or two cents, or whatever it is; if you take that pig-iron and make it into a piece of wrought iron pipe, it was worth a few years ago nine cents and now it is worth twenty-four cents a foot—and without any reason for the

change; if you take the same amount of pig-iron and make
412 it into hair-springs for watches, you get 119,000 hair-springs that are listed in the catalogue at \$1.00; that would be \$119,000.00; they are worth eighty cents apiece when sold to the jewelers in the city. That same pound of pig-iron may be worth a few cents in a manufactured state, or it may be worth over \$100,000.00 in a manufactured state. I believe that that should be considered in the appraisement of gas properties. I believe there is an essential value that has not been properly treated by appraisers. In the appraisement which I made of the properties, I took the cost of the gas generators as far as we had records set down in the general manager's authorizations. I took the costs of the newer installations.

These new Jones sets were not included in my appraisement because they were constructed after June 30, 1914, but Mr. Vincent testified in making the additions for the later period that he had taken the costs of these new sets directly from the company's books. As I remember it, no parts of the new sets were included except a portion of the foundation, and some excavation, and so on, in the generator building.

Mr. Bosley: I want to emphasize the fact at this point that machines such as these have an increased efficiency after being in use for a couple of years. I believe that has an important bearing upon the question of present value.

413 With reference to our distribution system, there is a very short period after it has been laid during which defects are discovered and remedied, resulting in an increased efficiency in actual operation. The defects would be due to engineering oversights in the beginning; that is to say, a system ought to be at its best at the beginning. There is some cut and try about everything. In the installation of a new system, if an engineer neglects to make proper tightness, or forgets to put in a drip-box, or something of the

kind, the deficiency develops quickly and is remedied and the system is as good as it ever will be after that. There is probably some little period of experimentation and correction of defects due to oversight or neglect on the part of somebody or other, or some structural defects in the material, although there should not be. There is no doubt that the necessity for repairs is probably greatest in the first few months in a distribution system because of these slight defects that seem to be inevitable with human nature as it is, leaving out earthquakes and other calamities—causes over which we have no control.

I have only this further to add to my study of the amount of allowance that should be made for the purpose of fully covering deterioration and the present necessity for making replacements as the company's plant existed on June 30, 1914. It has been
414 with the greatest difficulty that I have been able to reduce the percentage of what I consider to be the present value down to as low as 93.7%; I made several calculations, all manners of calculations, including the maintenance, property replaced, abandoned, obsolete, non-operative, as taken from the company's books; that is, as given to me by the auditors, and in two of these calculations I found I came out with 97.13% value, allowing the book maintenance and book replacement and abandoned, obsolete and non-operative property. So that the difference between 97.13% as shown by the book figures and 93.7% as given in my statement, is the result of my own experience as a gas man, my own judgment applied to the property.

415 Mr. E. C. JONES, being recalled by the plaintiff, on direct examination testified as follows:

I have already testified with reference to the accrued deterioration and expected abandonments and replacements of plaintiff's gas properties in San Francisco at June 30, 1914. The condition of the manufacturing plant and distributing system during the year preceding June 30, 1914, and also during the two years succeeding June 30, 1914, was substantially the same as at that date. In making the figures I used three years for averages and with the single exception of Martin Station, I believe there would be no substantial difference in any of those years.

Mr. Bosley: Martin station was entirely eliminated from the operative property on July 1, 1915, as appears by the previous exhibits; and 40% of the value of that plant was included in exhibit No. 43 as an item of accrued deterioration or expected abandonments. The subject that we will now take up is obsolescence. I propose to offer testimony in this connection that will bear directly upon the question of present value of the plant, as affected by obsolescence, and also show certain facts upon which as a basis allowances
416 for obsolescence should be computed. I shall endeavor to establish, by the actual experience of the company and the application of proper reasoning to that experience, how the

element of obsolescence should be taken care of and how it affects the present value of the plaintiff's plant and property.

Mr. E. C. Jones resumed:

I came to San Francisco to take charge of the gas-manufacturing plant and distributing system on May 15, 1891. The San Francisco Gas Light Company was operating the gas works at that time. Mr. Crockett was President and Engineer of that company and I was appointed assistant to Mr. Crockett. It was stated that the reason for getting me out from Boston was to help Mr. Crockett build a modern gas works at North Beach, at Bay and Buchanan streets, on some property then recently acquired by the San Francisco Gas Light Company, and overhaul its other plants and get them in a more efficient operating condition. When I reached San Francisco I found the Potrero Gas Works manufacturing coal gas by what were then modern methods, and water gas by what was known as the

417 Springer process for manufacturing water gas, for which I believe the San Francisco Gas Light Company had purchased the patent rights. The gas works at First and Howard Streets was a coal gas plant, and was operated to its full capacity. The gas works at King street was equipped with coal gas benches, which were considered out of date, and it was not in operation. The coal gas plant at the Potrero was in a sort of metamorphic condition. At about that time, improvements were being developed in the manufacture of coal gas, by the application of regenerative furnaces to the coal gas benches, and I was asked to try a series of experiments with different types of furnaces, to demonstrate which was the best, in order that that type of furnace might be adopted when the North Beach gas works was built; and it was finally decided that the Weber full-depth regenerative benches were most satisfactory. The Potrero plant, in 1891, consisted of 18 benches of six retorts each in operation, and two Springer water-gas sets in operation, and 42 old fashioned benches of six retorts each, not in operation. Those benches were in what is now known as the old retort house. The coal used at the Potrero and at First and Howard streets was bituminous coal brought from Australia by ships that started from England with general merchandise cargoes and picked up a cargo of bituminous coal, more as ballast than anything else, to bring to San Francisco, in order to get a return wheat cargo to England; it gave the gas com-

418 panies of the state quite an advantage in very low freight rates from Australia to San Francisco and all California, and also permitted them to use what was considered an excellent quality of bituminous coal, not quite so good as the coals of Pennsylvania and West Virginia, but better than any of our domestic coals or the coals from Vancouver, British Columbia. That condition prevailed until it was found that, owing to the comparatively small population of San Francisco and the surrounding country, and the almost entire lack of manufacturing in the district, coal gas, which had as its residual coke, amounting to from 60 to 65% of the total weight of the coal, had no market for its coke, and it permitted

coke men,—men in the business of buying coke at wholesale and selling it at retail for domestic use, or for the firing of boilers in industrial establishments, to manipulate the prices of coke, so that coke became at times a nuisance to the gas company, and while we were buying coals at from \$6.50 to \$7.75 per long ton, the price of coke would often go down to \$3 per short ton. That affected the cost of gas materially, because in the manufacture of coal gas the credit for coke, tar and ammonia is the only thing that makes the manufacture of coal gas possible in any part of the country; so it was found that the immense accumulations of coke were a detriment, and the companies in California looked about for a way to remedy this trouble. At that time oil was being discovered in more or less quantities in Ventura County. The Pacific Coast Oil Company had an

419 excellent oil for sale, and it opened the way for the manufacture of water gas, which at that time was extensively used in the East. In order to make the water gas most efficiently and economically, it was necessary to have a form of carbon best represented by anthracite coal, hard coal. The only source of anthracite coal at that time available in California was from the mines in Wales, and the coal was shipped from Swansea directly to California. We were able to get the Welch anthracite coal at prices ranging from \$7 to \$12.50 per ton, for the reason that we had an ample supply of wheat for the return cargo, and the coal was considered then as more or less of a ballast proposition. The water gas apparatus used with high cost oil had this advantage, that, in the absence of anthracite coal, it was possible to use the coal gas coke in the water gas generators, and the coke was so used in order to control the coke market of San Francisco. It had an appreciable effect on the price of coke; we were compelled to use a large quantity of coke in the water gas generators, in order to maintain a living price for the remainder which we sold to the wholesale dealers of San Francisco.

The coke in the water gas process took the place of the anthracite coal. Whether we used coke or anthracite coal we had to use some oil. The oil used gave the water gas its candle power, and practically doubled its heating value; the water gas being simply a vehicle—the hydrogen and carbon monoxide, known as water gas, was simply

420 a vehicle for carrying the hydro-carbons which furnished the major portion of the heating value and all of the candle power. In the construction of the North Beach works, it was determined to build two Springer water gas generators, and at that time the tendency of the price of oil was downward, and the development of oil in California gave promise of large quantities to be had with a constantly lowering price, which proved to be true; but the directors of the San Francisco Gas Light Company decided that the oil situation at that time was so uncertain that they must construct 20 benches of modern coal gas apparatus in order to protect themselves against the manipulation of oil prices, and 20 benches of the most improved full-depth regenerative furnaces were constructed at North Beach for the purpose of providing coke for the water gas generators, in the absence of anthracite coal, and for the further purpose of permitting the company to manufacture coal gas

should the price of oil become prohibitive; so a water gas plant, consisting of two Springer generators and 20 benches of coal gas retorts, was constructed.

The water gas plant was laid out and the work of putting in the foundations was begun shortly after May 15, 1891, and on September 9, 1891, actual work on the construction of the generators began, and on January 18, 1892, the North Beach works started manufacturing water gas. The starting of this plant permitted the shutting down of the old Howard street gas works, the first gas works built in San Francisco. The works were built in good faith, using the best types of apparatus known to the art during the different periods of its operation, beginning with iron retorts and then clay retorts, and increasing the efficiency and economy of operation as the knowledge of the art permitted, until the time arrived that the full-depth regenerative furnaces made it possible to produce more gas per pound of bituminous coal and use a small percentage of the resultant coke as fuel for heating the furnaces, and as these improvements could not be applied to a gas works which was located in the immediate center of the manufacturing district of San Francisco, within two blocks from Market street, it became necessary to look for a location outside of the residence or business district of the city, a location that was on tide water and near railroad facilities, because it must be remembered that when the First and Howard streets works was built in 1854 it was on tide water, and the growth of the city and the filling of the water lots between Beale street and what is now the Embarcadero placed these gas works several blocks inland; so, the old Howard street works became what is known as obsolete; the old works had done the best it could, using the most approved forms of apparatus up to the time it became obsolete, changing the quality of the coal so as to make the best quality of gas to serve the public, but through no fault of its own, and through the growth of the city, which placed it away inland and in a manufacturing district where it became a nuisance, it became obsolete. But there was another angle to it. The North Beach gas works was built to take care of growth in the gas business in San Francisco that was very apparent in 1891, and while the North Beach gas works was started January 18, 1892, we did not dare to shut down the Howard street works at once; it was necessary to prove out the new works and maintain the old works under fire until such time as the new plant had demonstrated its usefulness, and shown that it had no construction defects; and then the Howard street works was shut down in the late spring of 1892, but was then held as a stand-by apparatus. The Howard street works became obsolete through the use of methods of manufacturing gas that were unknown when it was constructed, and unknown all through the period of its usefulness up to the very end, and then it was made obsolete by water gas apparatus which was covered by United States letters patent. The San Francisco Gas Company had purchased and had the right, and the exclusive right, to the use of those patents in San Francisco; that is to the best of my knowledge and belief. I don't know whether the Pacific Gas Improvement Company also had

purchased the right for their district or not, but if they had it would not change what I am saying in the least. The North Beach coal gas construction was started May 7, 1893, and 20 benches of retorts, 9 retorts to a bench, were built. In the starting of a new coal gas works it was necessary to dry out the benches very carefully at first, and there was a slow fire put under these benches October 11, 1894, and the 10 benches were actually fired for the use of gas-making December 18, 1895; the first coal gas was made at North Beach December 27, 1895. But the manufacturers of coal gas at North Beach was never considered very successful. The plant was built for the purpose of protection, protecting the company against shortage of anthracite coal, and to provide coke as I said before for firing water gas generators; and the main reliance of the company was on the water gas generators.

The development of oil in California continued actively and the price of oil constantly diminished, making it possible to increase the amount of water gas and proportionately diminish the amount of coal gas. But other elements entered into these changes. Australia began manufacturing for its own needs, so that it was not so easy for the English ships to get charters for cargoes of general merchandise to Australia; at the same time the wheat crop of California was diminishing every year and it is easy for any one who has lived over twenty years in San Francisco to remember that at times there were as many as 50 English wheat ships at anchor in the vicinity of Port Costa waiting over one season for the planting and harvesting of next year's wheat crop. That discouraged the bringing of bituminous coal from Australia to California. The fact that Australian coal could not be purchased at any reasonable price without putting on ships for the sole purpose of bringing the coal, with the necessity of sending her back in ballast, caused the gas companies to look for another source for bituminous coal because the anthracite coal market then was not settled; it was difficult to get anthracite coal from Wales, and it was becoming more and more difficult, and the price was getting higher; therefore the gas companies of the state were compelled to use an inferior grade of coal from Vancouver and afterwards a still more inferior grade of bituminous coal known as South Prairie coal from the State of Washington. The South Prairie coal started from the mines in fairly good condition, but it had a habit of slacking by handling, both at the coal-bunkers at the point of shipment and on the way down in the ships, and with the rehandling necessary, getting it into the sheds, so that when it finally reached the retorts it was in the condition known as culm; it was slacked coal and in such condition that no Eastern Company used to the good bituminous coals of the Atlantic sea coast mines would think of using; we were compelled to use it because we were not sure of anthracite coal, although we had south other sources of anthracite coal, had gotten anthracite coal from Cerrillos, New Mexico, and went so far as to import one cargo from Tonquin, the French province, that was disastrous; the coal was never used; it would not stand shipment and came into the market almost in the condition of dust; but we were compelled to use

coal for coal gas making in order to provide some form of carbon, suitable form of carbon for use in the water gas generators; the price of oil was going down and the quantity was increasing all the time so that it did not take much of a prophet to foresee the time when either water gas or some other kind of gas method using oil extensively or exclusively for the manufacture of gas would sup-
425 plant coal gas, and so it did. Little was known about oil gas in those days, or the so-called obsolescence of the coal gas works at First and Howard, and the Potrero and North Beach Stations by the invention of what was known as the crude oil water gas process in 1889. At that time there was no place outside of the oil fields of Russia where it could be economically employed, because the price of oil in the East at that time precluded the use of oil exclusively for the manufacture of oil gas. The patent on the process slumbered until such time as the development of oil in Colorado and California made it possible to build a plant at Colorado Springs and afterwards at Pasadena, in California. The first oil gas apparatus was very crude, and it was built on the wrong foundation; that idea seemed to be to make as much lamp-black residual as possible, with the result that the gas was not very good and it required a large quantity of oil for its manufacture; but the development of oil in California and the high price of anthracite coal brought from either Colorado or Wales, made it impracticable to continue the manufacture of water gas; bearing in mind all the time that the gas company always had two things in view, first and always, the service to the consumer, with a gas of good quality and at a reasonable rate; that may be construed as selfishness entirely, as you please, because the reasonable rate has as much to do with the increase of the business as has the good quality of the gas; and the company that sells its gas
426 at a reasonable rate consistent with local conditions of raw material and other things is bound to profit by the increase in business. So gas companies are continually looking about for a better and cheaper way to make gas, always considering the hazard of the business. One of the greatest hazards of a gas business is the sudden elimination of a raw material from the market or a very great increase in price of raw materials.

The plant at Pasadena was established some time prior to 1902, but I do not know the exact date. The other plant that I referred to was at Colorado Springs. I visited it in 1891 and it was then in operation. In 1902 there was not the quantity of oil in sight in California to warrant the manufacture of oil gas. It might be well to say that the difference between coal gas and water gas is largely in the difference of the raw material that must be purchased and handled. For instance, to manufacture 1,000 cubic feet of coal gas ordinarily from the coals available in San Francisco would require about 224 pounds of bituminous coal, while the amount of solid carbon with its ash contents and moisture, either as coke or anthracite coal, necessary to make 1,000 cubic feet of water gas would vary from 30 to 40 pounds; so that as the wheat crops of California diminished the manufacture of water gas in place of coal gas diminished the necessity for many ships to bring coal, because for a long

time after the handwriting was on the wall that the wheat exports from California were going to cease, the gas companies had availed themselves of these smaller needs for coal by buying 30 or 35
427 pounds of anthracite coal from Wales instead of 224 pounds of bituminous coal from Australia, to manufacture their gas, for each 1,000 cubic feet. That brought us down to the time when it became possible, owing to the oil situation in California, to look to the manufacture of oil gas, using oil exclusively for the manufacture of the gas, and in 1901 there were several small oil gas plants in California that had been built by the California Central Gas & Electric Company in 1901 and '2. Such small plants were built at San Rafael, Santa Rosa, between Grass Valley and Nevada City and other small towns, Colusa and Chico, but the experiments with oil gas, which made it possible to use oil exclusively for gas making, in large units, were made in Oakland. During the spring and summer of 1902 the California Gas & Electric Corporation entered into a contract with the Oakland Gas, Light & Heat Company to supply the Oakland company with oil gas. Station B at First and Market Streets was therefore selected for the manufacture of the oil gas. Everything I am saying now refers to Oakland. This station had originally been erected as a gas works by the Equitable Gas Company in opposition to the Oakland Gas, Light & Heat Company. The first oil gas ever manufactured in Oakland was made at Station B September 1, 1902. That, as a whole, is a quotation from an article entitled "The History of Gas Lighting in Oakland" which appeared in the "Pacific Service Magazine," among a number of such articles that I wrote. The works of the Equitable Gas Company was equipped to make gas by what was known as the Hall process. This
428 process had proven to be unsuccessful at the Equitable Gas Light Company's works in San Francisco, and was never operated in Oakland. Portions of the plant, together with necessary additions, were utilized to make Lowe crude oil water gas, and the plant started operations September 1st, 1902, making 130,000 cubic feet of gas the first day and using 13.8 gallons of oil per cubic foot. During the month of September, only 11,074,100 cubic feet of gas were made, and the average amount of oil used was 9.68 gallons per thousand cubic feet. I am going into this so fully in order to build up the development of oil gas. On October 21, 1902, the plant was placed in my charge; that is, I was given full charge of the Oakland plant, to see if I could make anything out of it; it was going down and the California Gas & Electric corporation was not able to fulfill the obligations of its contract with the Oakland Gas Light & Heat Company, and there was a forfeiture for gas that could not be delivered by these new works to the Oakland Gas Light & Heat Company, and it meant the total loss of their works and the forfeiture of their contract, and the privilege of purchasing the stock of the Oakland Gas Light & Heat Company, if there was a failure, and failure was staring them in the fact; I took charge of the plant on October 21, 1902. Up to that date the greatest amount of gas made in a single day was 631,200 cubic feet. After October 21st improvements were made in

the process and operation, which immediately increased the capacity of the generators; and on November 7th the amount of gas made was 1,000,800 cubic feet, and the total amount of gas made for November of that year was 27,827,300 cubic feet. On December 10, 1902, the No. 1 set made 1,204,600 cubic feet. During this development work the knowledge gained in operating No. 1 generator was applied to the remodeling of No. 2 generator. This was fired January 10, 1903, and made gas January 19, 1903. These two generators supplied the entire demands of Oakland with considerable spare capacity, and a maximum daily make of gas of 2,220,000 cubic feet of gas, from February 5th, 1904, until September 11, 1904, when what was known as No. 3 generator was put in operation.

The average amount of oil used per thousand cubic feet of gas in Nos. 1 and 2 was about $10\frac{1}{4}$ gallons per thousand cubic feet. No. 3 set was constructed along the lines of new theories in oil gas manufacture, and much was expected of it. It consisted of two shells 16 feet in diameter and 28 feet long, and included an improved form of wash box. When the Oakland works were started, the troubles from pitch and heavy tar in the wash box were of such a serious nature that some days we would make gas 20 hours and clean the wash box 4 hours; the next day we would make gas for 4 hours and clean the wash box for 20 hours; the next day we would not make any gas at all, because we devoted the 24 hours to cleaning the wash box, and it became necessary to get busy and invent a self-cleaning wash box, and that is the beginning of the wash box that is now used with what is called the improved Jones process.

It was expected that this new apparatus would have a larger capacity and greater economy than the old form of apparatus, and it realized the expectation as far as capacity was concerned; but the amount of oil used per thousand cubic feet of gas, was only slightly less and during some periods as much or even more than the old process.

The experience gained by the development of this process resulted in the invention of the Jones process for manufacturing oil gas. Plans were completed during the fall of 1904 for a new form of 16-foot oil gas generator to be constructed at Martin station, San Mateo County.

The first set was completed and made gas at Martin station February 17, 1906, and the first gas was sent from Martin station to Potrero station of the San Francisco Gas & Electric Company through the 12-inch high-pressure main on Tuesday, February 20, 1906.

During the early part of 1906, a generating set of what is now known as the old Jones type and is now the No. 1 set at the Potrero was constructed. This set was fired up Monday, February 23, 1906, and the first gas was made March 10, 1906. These two units, the one at Martin and the one at Potrero, were in operation on the morning of April 18, 1906. The oil gas set at the Potrero was the only portion of the plant in operation. As I remember, the water gas plant was shut down, and the coal gas plant was shut down, and the Independent was not operating, but

the Springer water gas sets at the North Beach station were in operation, so that the city was being supplied by water gas from North Beach station and by oil gas from the Potrero and Martin station; the effects of the earthquake cut out North Beach station entirely from any future use.

431 The building came down over the Springer sets at the

North Beach station so that they were practically destroyed; it would have taken many months to have reconstructed the plant, it was in such bad condition. The coal gas benches and retorts were badly cracked, and the building was cracked, and the roof was damaged, and the pipes were broken; the same applies to the coal gas parts of the North Beach station; they were damaged almost beyond repair. The Pacific Gas Improvement plant at North Beach was not making gas at that time, but was practically a total wreck, due to the earthquake. There was practically little damage at the Potrero station from the effects of the earthquake; it might be called negligible, because the Potrero station was located on a rock foundation, and the movement at the Potrero station was not great; even chimneys and elevated water tanks were not affected by the earthquake; the effect at the Potrero station was not nearly so great as it was at Martin station. At the Pacific Gas Improvement Company's works the last coal gas was made September 6, 1901, and the water gas works were shut down and all gas-making operations ceased November 8, 1903, so that it was a dead gas works at the moment of the earthquake. But the North Beach Gas Works, within a few blocks of the Pacific Gas Improvement Company's works, was manufacturing water gas. Following the oil gas story from the time No. 1 set was built at the Potrero station,—the interference of the earthquake with the gas business of San Francisco, making it impossible to resume operations at the North Beach works within any

432 reasonable time to supply the demands of the city, and the lack of coal or coke for the manufacture of water gas in very large quantities, or coal gas in very large quantities, showed me that we must depend entirely upon oil gas in San Francisco until such time as there should be some revolutionary change in the art or a change in the conditions by which we obtain crude material, either coal or oil; and so I bent my effort to the improvement of oil gas methods for making gas. There was another set under construction at Martin station in April, 1906, and this was rapidly rushed to completion; and at the Potrero station we began the construction of other 16-foot sets so that on February 1, 1907, what is known as No. 2 of the old set was started, and No. 3 and No. 4 were constructed between April and August, 1908. They are now known as the old Jones sets. That accounts for 1, 2, 3 and 4 sets. So that up to the time of the starting of the second set at Martin station, and the starting of No. 2 set at the Potrero station, February 1, 1907, the gas business of the city had to be cared for by the oil gas sets at the Potrero station and at Martin station, and they were not sufficient to supply the demands of the consumers.

That brings us to the Independent station. The Independent Gas & Power Company was incorporated January 5, 1901, and started

that year making gas; a complete water gas plant was erected on land adjoining the Western Sugar Refinery at the Potrero station.

433 The plant consisted of two Lowe double super-heater water gas sets. I might say here that there should be a distinction between the name "Lowe" as applied to water gas, which refers to Professor T. S. C. Lowe, the father, and the name Lowe, as applied to oil gas, is L. P. Lowe, the son. Gas was made about January 1, 1902, and delivered to the city during the period from the starting of this works until it was taken over by the San Francisco Gas & Electric Company in 1903. Welsh anthracite coal was used as fuel in the generators.

In 1904, four more Lowe double super-heater water gas sets were added to this plant and those sets were operated with Welsh anthracite coal, or gas coke as fuel until April 6, 1906, when the plant was shut down. That was 12 days before the earthquake.

On July 11, 1906, the Independent plant was started up using anthracite coal for the manufacture of water gas. I might say that this anthracite coal had been brought over from the stock on hand at the North Beach station. On July 14th a mixture of coal, lampblack and coke was used in the generators. From July 17th to 20th, inclusive, all lampblack was used as fuel. This was probably the first instance where lampblack was used entirely as a fuel for the manufacture of water gas. It was then in an experimental stage for the records show days when coal was substituted and periods where lampblack and coal were mixed.

434 From May 4, 1907, until December 28, 1907, lampblack was used exclusively in the generators, and from December 28, 1907, to January 13, 1908, a mixture was used of coal and lampblack. From January 13, 1908, to March 17th, anthracite coal was used exclusively in the generators, and from March 17th to March 31st a mixture of lampblack and coal was used.

I am reciting this to show the difficulties of developing a process. Anybody could use lampblack for making water gas nowadays. It is like setting an egg on end, but we had to learn how to do it, and we went through all this troublesome and expensive experience to find out how to do it.

From March 31, 1908, to July 24, 1915, the date of the shutting down of the Independent plant, lampblack was used exclusively in the Independent generators for the manufacture of lampblack water gas, and the amount used averaged about 40 pounds per thousand cubic feet of gas. Since July 24, 1915, the Independent station has been kept in repair as a stand-by plant, but has not been operated.

That brings us down to the development of the old Jones process, and the finding of a use for the by-product lamp-black; it would have to be used either as a fuel for the manufacture of water gas, if a water gas plant were available, or be made into some form for domestic fuel, such as briquettes. The old process used anywhere from 9 to 9½ gallons of oil per thousand cubic feet of gas, and produced from 20 to 30 pounds of lampblack, according to the condition of oil and operation, and I felt that we were wasting oil; that if a portion of the oil could be made into gas, I saw no reason why

nearly all of the oil should not be made into the gas, and I looked forward to the day when the use of 9, 10, 11 or 12 gallons
435 of oil for the manufacture of gas would be looked upon as wasteful, and if the day arrived when utilities or industries would have to conserve oil, I believed that the utility using the least amount of California's oil would then be in the best condition; and for that reason my son and I devoted ourselves to the study of how to make oil gas, using the least oil, believing that the theoretical amount of oil contained in the gas plus the oil necessary for obtaining the heat, amounts to something less than 5 gallons per thousand cubic feet. That was our goal, and we wanted to keep as nearly to that as possible; and we firmly believed we could keep inside of 7 gallons per thousand cubic feet; it is so simple to experiment on paper and take out patents, but it is so expensive to ever get those ideas tried in actual practice; and it became necessary to test the ideas contained in this new process at some point, and at the same time not waste the company's money or make any mistakes that could not be easily remedied without sacrificing the service of gas to the consumers of San Francisco; and it seemed to me that the Metropolitan plant was the best place to try the experiments and demonstrate if there was anything or not in these new ideas.

The Metropolitan plant was started by Professor T. S. C. Lowe in the year 1900, as the San Francisco Coke & Gas Company. Coke ovens were erected with the intention of manufacturing coke, and during the experimental period, many kinds of coal were used and the gas was wasted. Coke was finally made from South Prairie coal from the State of Washington, and this coke was tried as a water
436 gas fuel at the Baldwin Gas Works at Fifth and Stevenson streets, but it was abandoned, as it contained too high a percentage of sulphur. An effort was made to make the coke for foundry purposes, but it was found to be too soft. The capacity of the oven was about 6 tons of coke per day.

In 1903 the company was reorganized under the same name; the new company remodeled the oven and began the making of oil gas, selling from 350,000 to 500,000 cubic feet per day to the San Francisco Gas & Electric Company.

In 1904 the company was again reorganized as the Metropolitan Light & Power Company, and began the building of a distributing system and sold gas to its own consumers. Under the direction of its engineer, Mr. John C. H. Stutt, a second coke oven was built for the purpose of manufacturing oil gas.

In 1907 a 15-foot oil gas generator was erected, and in 1908 a second 15-foot oil gas generator was built. At that time the company sold about 1,200,000 feet of gas daily, using a petroleum distillate obtained from the Standard Oil Company for manufacturing its gas. This plant was turned over to the Pacific Gas & Electric Company on December 11, 1911, and at that time two oil gas generators and two coke ovens were in operation manufacturing oil gas. On January 12, 1912, both coke ovens were permanently shut down.

That becomes a case of obsolescence for the purpose of coke ovens. They were built in good faith by one of the greatest inventors of

this age, Professor Lowe, and he had reason to believe that he could make foundry coke out of the bituminous coals available on
437 this coast, and it was only after he tried it and failed that he found that our coals out here were not so well adapted to the manufacture of hard coke, foundry coke, like the Connersville or any of the Beehive, or Otto-Hoffman or Semet Solvay cokes, as some high-grade bituminous coals of the East; but it was done in good faith, and it seems to me to show to an engineer that if the oil should fail in California, or if the gas company should be unable to obtain oil in sufficient quantities to make gas, that they could not look for a supply of bituminous coal anywhere; under present conditions, it would be impossible to get foreign coals, even from Canada, and the local coals could not be obtained in sufficient quantities, and they are not of good enough quality to warrant a gas company making gas of them; and while they are displacing coal gas made in modern regenerative benches in the East, by different types of by-product coke ovens and doing it successfully, we, in California, could not do it for the reason that we could not obtain a supply of bituminous coal in sufficient quantity to supply San Francisco alone; if we could, we could not market the by-product coke which we would produce, nor could we market the tar which we would make, and we have not the plant nor the ground room to build such a plant; a coal gas plant to supply San Francisco to-day would require 120 acres of land accessible by tide-water and railroad. The amount of coal on our peak would amount to sometimes as much as 2,000 tons of coal a day, during the winter months, and the residual coke would amount to about 1,200 tons a day, which
438 it would be necessary to dispose of at a price which would warrant us in paying a fair price for the coal, and that with the tar would make coal gas extremely expensive in San Francisco and practically out of the question, because if any concern tried to market 1,200 tons of solid fuel in San Francisco and vicinity to-day, he would do two things, he would glut the market and drop the price and interfere with the use of gas as fuel; gas is conceded to be the best, most economical and efficient fuel there is, and it would simply hamper that company's business, so it would work to the detriment of the gas company in every way. I cannot find, upon inquiry, that there is coal enough available to supply the domestic needs of San Francisco for the coming year. If the supply of oil runs out, we will have to get together and talk over what we can make gas out of. The newspapers are full of it. I have a clipping from yesterday's paper saying that fuel shortage is feared by railroad men; coal almost off the market, and oil going.

On January 31, 1912, the entire Metropolitan Works were shut down for the purpose of remodeling, to try out the new ideas in oil gas manufacture, and on October 27, 1912, what is known as the No. 4 generator was started, and on December 14, 1912, No.
439 1 generator was started making gas.

The improvements to those two sets included a partial application of the principles of the new improved Jones oil gas process. This was the first practical experiment with this new process.

These experiments thoroughly demonstrated the value of the new process, and pointed to the economy to be gained over the old method. On September 3, 1914, No. 4 generator was shut down for the purpose of converting it into a complete improved Jones oil gas set. This generator was again started October 30, 1914, and No. 1 was shut down November 1st and started up again December 3, 1914.

The results obtained from changing over the Metropolitan works into a new process for making an oil gas were so satisfactory that the company felt warranted in building two larger sets at the Potrero gas works, and construction of those began in 1914 and proceeded during a large part of that year, and on May 3, 1915, the first of these new sets was put in operation, and shortly afterwards the second set was put in operation, and has been at work constantly since; and the results of our experiments, and the resultant good work that has come from these sets has been very gratifying, and the amount of oil necessary to make 1,000 cubic feet of gas has been reduced about 2 gallons per thousand cubic feet. I now use about 7 gallons, including all oil used for heating the apparatus and making gas; and the amount of lampblack produced as a by-product has been materially reduced to a point about ranging from 4½ to 6 pounds to the thousand cubic feet with units the size of the Potrero station; perhaps ranging 10 pounds or more with other units. It depends somewhat on the quality of the oil used and the amount of the skill used in operating the machine; but a substantial reduction in the amount of oil used has resulted, and gas of good quality is made, the service is good, and it seems to me that the new process is satisfactory to the company, and should be so to the consumers; that is the development of the oil gas business up to and including our present knowledge. In the manufacture of oil gas a large quantity of steam is necessary for various purposes; for the operation of auxiliary machinery, for heating oil and for disassociation into gas, and we find that the new process does not produce enough lamp-black to fire the boilers and make the necessary steam. We furnish our own market so that nothing is made for sale at the Potrero Gas Works except gas, a small quantity of tar and whatever may be recovered in the way of benzole from the compressing of gas for high pressure distribution. That covers the history of gas making in San Francisco from the time I came here in 1891 down to the present time.

Mr. Bosley, counsel for plaintiff: Now, Mr. Jones, I would like to direct your attention to the meaning of this term obsolescence; and first consider what is the significance of obsolescence from the point of view of the company or a person who is about to erect new gas works in a place where none previously existed; if you were called upon to advise such a corporation or a person as to the kind of gas works that he should erect what would you recommend to him?

Mr. Jones resumed: Were I called upon as a consulting engineer to give advice as to the kind of plant that should be purchased for

an entirely new gas works it would depend first upon local raw material conditions, the market and its permanency for supplying certain raw materials, bituminous coal, anthracite coal or oil, for the manufacture of gas; we will assume that the location is San Francisco and that oil gas would be recommended as the best present way of making gas for all concerned, and that an ample supply of suitable oil could be obtained at a fairly reasonable price; and we will assume that the purchaser and I go together to a manufacturing establishment, to mills, where they could build oil gas apparatus and we inquired as to the cost of such apparatus and the time necessary for its construction and erection, and we find a new process for making oil gas, one that was covered by a patent; and we will assume that the purchaser, the prospective purchaser, could also purchase the right to use the process for the units that he might need, but the manufacturer might have on hand some of the old oil gas machinery either similar to the 16-foot sets at the Potrero Station or some of the older types of apparatus which he would be very glad to dispose of at a lower price, an attractive lower price; and my advice

as an engineer would be that if the newer, most economical
442 and efficient apparatus could be purchased, even at a higher price, even at a much higher price, that my client must not think of buying old fashioned machinery which I consider obsolete; I believe that would be one angle of obsolescence, that that old machinery not in use and waiting to be purchased for new use in a new gas works is obsolete. If the cost of installation was not disproportionate, I believe it would be the duty of a person establishing a new works, to buy the most efficient and economical apparatus—it is his duty to his consumers and his stockholders. It is proven every day in Victrola construction and other things universally used, that a slight degree of increased efficiency would be sufficient to influence one's judgment so that they would take the better apparatus. A person who is buying something new desires to obtain the one that is best suited to his needs and most efficient for the purpose that he is desiring to accomplish, and some very slight improvements will sometimes make a whole line of goods obsolete.

Mr. Bosley, Counsel for Plaintiff: Now, we may have a slightly different case, Mr. Jones: supposing you were acting as the consulting engineer for a company or an individual which has an established gas works in operation; we will assume now for the purpose of supplying the demand that is made he is contemplating the construction of an additional unit; in other words, he has had enough generator units to supply the demand up to this time, but the demand has grown so that his plant is reaching a stage of in-

443 adequacy; he must add to it. Now, being about to add to this plant for the purpose of meeting the increasing demand he is considering the construction of an additional generator or manufacturing unit; what would be your position then in that case with reference to availing yourself or advising your client to avail himself of the newest and most approved apparatus and methods of manufacturing gas with reference to this new unit; assuming now

that the different kinds also could be used in conjunction with the existing ones.

Mr. Jones resumed: If the new apparatus was needed for present or prospective increases in the output of gas I would recommend my client to purchase the most improved machinery, to obtain the highest efficiency and avail himself of the greatest economy in the purchase of the new machinery. I do not think the situation there would correspond very closely with that of erecting an entirely new plant. There would be other angles to it where the question is limited to that entirely, such as the plant in question, we will assume, would be equipped with apparatus which was usable and fairly modern and before the invention of any improved process was satisfactory to everybody, both the company and the consumer, and the rate-regulating bodies, and along comes a new improved apparatus which has advantages or makes gas with greater efficiency and for less cost; and I would feel that my client should put in this new form of apparatus, but at the same time I would feel compelled

444 to advise him that he must not consider any of his other apparatus as obsolete; up to that moment it was the best that was known; and now he is putting in new apparatus and my advice to him would be to use the new apparatus as continuously as possible, to avail himself of the savings and rest up, hold as stand-by apparatus as many units as were necessary to adequately protect his plant in case of a breakdown of the new apparatus; but he should not consider that old apparatus obsolete unless he is permitted to avail himself of sufficient savings from the new way of making gas to write off and retire the old apparatus within a reasonable length of time; because we will assume that the new way of making gas has not become general, because it is patented, protected by letters patent, and we will assume that the man who introduced it or the company who introduces it must also purchase the right to use it so that it is not general property; but the right to use that particular improvement is an essence of the apparatus itself. Now, if the man owns that apparatus, coupled with the right to use it granted by the inventor, it seems to me, it is my opinion that he is entitled to lay by enough savings on the new form of apparatus, savings made by the change in method. I would recommend the taking of the newer and more improved apparatus, if the owner of the existing plant merely wanted to add an additional unit to meet the increasing supply and not for the purpose of displacing any of the old.

Mr. Bosley, Counsel for Plaintiff: Now, suppose we have a further condition, one where the owner of an existing plant, which
445 is adequate for the present and for a reasonable time in the future, to produce the amount of gas required by the consumers, and the owner of that plant is advised that a new invention has been made, calling for the use of different apparatus, and a different method or process for manufacturing gas, and he were to call upon you for advice concerning the wisdom of substituting the new apparatus and the new method for either a whole or a part of his

old apparatus and his old methods; what would be the point now to which you would direct your investigation in that case?

Mr. Jones resumed: If I may be permitted to say it, I think therein lies one of the greatest problems confronting utilities today; all improvements in manufacture or distribution should be made use of by up-to-date concerns as rapidly as they may be tried out and proven so as not to waste money, and the company should avail themselves of the cheapest, most economical way of making their product for the advantage of their consumers and their stockholders; for such a company would be confronted with the problem or the question, how can I sacrifice and write off of my books as obsolete well kept and up to this moment a satisfactory plant for manufacturing gas simply because a new method has been brought forward which promises a saving in the making of gas of more or less money; let us assume, and it won't be an assumption, it will be an actual case, a large gas company that is making gas by a method that is not particularly efficient nor is it particularly economical, and the company would

446 like to avail itself of a better way of making gas, but the rates have recently been fixed; the plant is evidently satisfactory to the California Railroad Commission, and the rates are predicated on the operation of that old plant, and there is no question but that everybody is satisfied, the consumer—we will leave the consumer out of it—the company and the regulating body; and the result is that the company does not care to run the risk of having this plant become obsolete by adopting new improvements of any kind; if that sort of thing keeps on it will paralyze the inventive work and the improvements of engineers and utilities will settle back into a well-enough condition and let well enough alone and simply keep their house fixed up and make gas the way they did instead of doing it the way they ought to do it to-day.

Mr. Bosley: Before you would advise a company having a plant that is in good operating condition and adequate for present needs and a reasonable time in the future to discard any part of the old plant and substitute a new, would you not have to be satisfied from your investigation that the economies to be effected by the use of the new plant would not merely be nominal, but would be sufficient to justify the sacrifice of the capital involved in abandoning the old plant?

Mr. Jones resumed: I think we could answer that question from actual experience. The two new sets at the Potrero are not sufficiently large, together with the Metropolitan, to take care of peak demands of the city, and it therefore becomes necessary to operate some of the second best apparatus, the old sets, over the peaks, and during periods of repair of the new apparatus. Now, as an
447 engineer, if we were assured that the business would not grow, that we had a stand-still business, I would not be warranted in recommending to my employers the spending of money to put in the improved apparatus to simply supply the peaks, the tips of the demands, and as a stand-by for emergencies, until I felt reasonably

sure that the economy of the new apparatus would amount to enough money to warrant purchasing it and putting it in and permit me to write off the old apparatus. In my opinion stand-by apparatus of fairly good efficiency and economy should be considered as of 100% value and not obsolete until such time as the growth of the business would warrant putting in the most improved apparatus, and it is then that that apparatus ought to be permitted to be retired, and enough money from savings laid up in reserves to warrant the company in writing off and disposing of the old plant as obsolete. The new Jones sets, in many respects, are more economical and more efficient than the old sets. There is a difference in the quantity of oil required for manufacturing the same amount of gas; that is one economy. The new sets occupy less ground room per million feet of gas than any other sets that have ever been invented,—the investment per million feet of gas I believe is less. The labor is very much less;

the amount of oil used is reduced from about 9 gallons to
448 about 7 gallons, per thousand cubic feet of gas. It is true

that these savings or economies can be availed of only by the operation of those sets. If I had two more new Jones sets to-day at the Potrero Station in place of the four old Jones sets and the Independent plant, one or both of them would be used for a short time during the necessary repairs to the other sets, during the summer time, and one of them would be used for taking care of peak demands a few hours a day or perhaps one or two days a week during the winter peak; the rest of the time they would be idling as stand-by apparatus, and no economies would result during the period of their idleness.

Mr. Bosley, Counsel for Plaintiff: It is obvious, then, that a prudent investor would not erect two more Jones sets to meet the present demands and abandon the four old Jones sets and the Independent plant, when to do so would involve the expenditure of a considerable amount of capital and when the saving to be effected each year would be very small. I think we will introduce figures later on that will show that probably the saving to be effected from operating two new sets, as stand-bys, probably would not pay more than the interest on the investment. But the point that I want to make is that the substitution of the new sets would have to be justified by their economies being sufficient to make an interest return on the capital invested in their construction, and to amortize the capital that would be abandoned by reason of their erection. I would like to have your views on that subject?

449 Mr. Jones resumed: In answer to the question, the gas company would have to have the assurance or feel reasonably assured that the business would stand still, that there would be no increase of business. If I had a condition of growth of business I would have a different factor in the problem; you must study the prospective growth and supply the new apparatus to meet that growth, and not overdo it, not overdo supplying new apparatus; but the assumption that the gas company's business is going to

stand still, as your question implies, would mean that the man would not be warranted in putting in new improved apparatus, because at the present time the old apparatus is simply taking care of tips or peaks, and periods of necessary repairs; but if it were the new apparatus, the saving effected during these short periods would not warrant the extra cost and the danger of making obsolete this excellent second-class apparatus, making necessary the abandonment of the apparatus as obsolete. With an increase of demand, however, and the approaching inadequacy of the plant, as it stands, a different problem is presented. As the conditions that exist to-day would prove, we have a reasonable right to expect a 10% increase in the gas business, based on the history of the business for over 100 years; that is, the gas business will double itself in every ten years; of course, there are good years and bad ones; a 10% annual increase in output of gas, and basing our expectations and hopes on that, we have made plans and are going ahead to put in two new improved sets, but under present conditions, where it is

450 impossible to get steel or promises of steel, or pipe, or promises of pipe, we know it will be the fall of 1918 and maybe later before we can have them in operation, and by that time I believe and hope they will be needed. The erection of two new additional Jones sets would not involve the abandonment of the present four old Jones sets and the Independent plant. Without any reference to this case, or that the question might come up, here is one of our station records of past, present and the prospective future, which sets down the approximate dates of construction, operation and abandonment of the different kinds of gas apparatus, from 1900 to 1920. I don't know but what it might be a good exhibit in this case; it is one of our stations. I will provide other copies of it. As I say, this was gotten up without any thought of this case. It has no relation to the case. It shows that Martin station was abandoned in 1915, and that the independent station became inoperative due to the elimination of lampblack as fuel in 1915, and it shows the construction period of two new improved sets, Nos. 7 and 8, and then the abandonment of Nos. 1 and 2 of the old Jones sets in the fall of 1918, and as things have transpired, that would have to be set ahead a little, sometime in 1919, and that would leave two old Jones sets as a stand-by, abandoning the Independent station and two old Jones sets, when two new sets are completed, provided that these two new sets, which are saving us a little money, are permitted to earn enough money to permit us to abandon this other apparatus which would be good enough if we did not put in the new

451 generators, and besides that, apparatus which is as good as is being used elsewhere, either in the manufacture of water gas or oil gas.

The chart which I produced showing the changes in the probable demand for gas in San Francisco and the construction of the different plants has been an outgrowth of our experience in the gas business in San Francisco, because in conducting the business we are warranted in looking into the future, both as regards the additions of plant and our ability to get raw material for gas-making pur-

poses; I am not quite sure, but it is my belief, that the chart originated prior to April 5, 1916, but on that date it was brought up to April 5, 1916, and was revised on January 17, 1917, to its present condition. The chart shows the actual abandonment of certain coal gas and water gas apparatus, and the proposed abandonment of other apparatus in the light of the knowledge that existed or exists at the making of this chart, as applied to the future. The dotted line shows the capacity of the plants represented by the upper black line, less one unit, and in constructing this line it is considered good engineering practice to subtract the largest unit because the largest unit may fail and it may be necessary to shut it down for repairs, or some accident might happen to it, so that the wide space at the extreme right of the chart, between the black line and the dotted line, is caused by the subtraction of one of the large improved units. The irregular line at the bottom gives the maximum daily consumption per month, while the straight line which intersects some of the peaks of this irregular line shows the probable maximum daily consumption based on a 10% annual increase in the demand for the gas, and that 10%, as I said this morning, is based on the experience of gas business throughout its life. That 10% must be obtained by adopting, first, the primary proposition that the consumption doubles in ten years. By taking ten years and dividing it by ten, you would get 10%, as the average. That works out over periods of ten years, but with interruptions like the Panama-Pacific Exposition, which cause a large increase in one year, it sometimes takes two years to catch up with the increase, and that has been our experience. We are sending out now more gas per day than we did during 1916 at the same time of year, but we have not yet reached the 1915 output for the corresponding time of the year, but that will be wiped out over a period of ten years.

1916 was not altogether a satisfactory year, and the showing in 1917 would not warrant me in hoping that we would have a 10% increase for the year 1917, but my belief in the infallibility of this increase of 10% based on history is so great that I would say that for the decade beginning with 1910 and ending with 1920 the business would probably double. I have before me a chart not quite brought up to date—it is up to the 18th of May—which shows the output of gas in San Francisco to be well above that of 1916, but somewhat below 1915. The increase which we feel we have a right to expect, is based on the increased use of gas for industrial purposes and the finding of more uses for gas for domestic purposes, and the natural increase in population. Of course, we have found that the increase in the output of gas has been far in excess of that which we would be warranted in expecting from the natural increase in the population.

This chart shows an increase of more than double in ten years.

Mr. Bosley: There are other factors that enter, due to the fact that we took over the Metropolitan Company, and in 1903 the Pacific Gas Improvement Company and the Independent Gas & Power Company.

Mr. Jones resumed: This chart shows the total for the city and it is not a hard and fast rule that the increase is 10%. California has been remarkably fortunate in the increase of its gas consumption. For instance, during the period that we were speaking of this morning, in the development of oil gas, the daily output of the whole of Alameda County supplied by the Oakland Gas Light & Heat Company had not reached one million cubic feet a day, that was in 1902; while in 1914 the maximum output in Alameda County was in excess of nine million feet a day, that would be 900% in 13 years; that is the greatest increase to my knowledge in California; but San Francisco gas business prospered proportionately, due to the fact that on the 12th of May following the earthquake the people were only permitted to use a fuel which did not require a chimney, a flue, because there were no chimneys in condition to be used without having first been inspected, and the inspection service had not been systematized and it had not become practical; the people used gas through all kinds of appliances, for cooking and heating in their houses, and the gas appliances were not connected with flues, and the education of people in the use of gas during that period following May 12, 1906, taught the people the convenience, simplicity and cleanliness

of gas fuel and also the economy, and that did more to increase the output of gas in San Francisco than any efforts on our part could have done; so 10% per annum might be considered as the minimum increase hoped for. This chart was intended to cover the complete history of the apparatus, coal gas, water gas or oil gas, and I believe it to be correct; I have used it as an office reference since 1916, and I believe that the prophetic part of it, the future of it, is as nearly correct as we have a right to expect.

With reference to where I indicate the capacity of the generating apparatus installed, the straight line representing the condition for some period of time, and then a sudden increase representing a block or a step in the chart, and then in some places a step down from the highest amount—when a fellow falls out of a window he goes plumb down; it would destroy the graphic feature of the chart if we tried to represent it by a curve; we have to represent the development by either a straight line, or, in this case, to represent a moment of time; there are two parallel, vertical lines hatched between to show that there was a moment of time of abandonment, but a single point was all that was intended to be shown as the moment of abandonment. If a new unit is added, that lifts the capacity of the plant installed immediately. The net increase would be the difference between the new one that was added and the old one that was abandoned, and the horizontal line between the two represents a period when there was apparently no change in the operations, excepting the daily or weekly changes of more or less capacity.

455 The Independent station in the last generating capacity curve between the years 1918 and 1919 was put in this chart as inoperative, due to the elimination of lampblack fuel, but is held as a stand-by plant. Where I put in No. 7 and No. 8, the hatching of that curve does not take in the Independent station capacity

also—it eliminates the Independent station capacity; you will notice the Independent station capacity has not been reflected in the line that was taken up there. I did not care to describe it as abandoned, because I do not consider it abandoned to-day. The Independent station occupies a peculiar place in our gas properties. Now, as I said this morning, on the 18th of April, 1906, the gas was being supplied to the city by one oil unit at Martin station and one oil unit at Potrero station, and the water-gas plant at North Beach station; that water-gas plant at the Potrero station was shut down and the Independent station was shut down; the water-gas plant at the Potrero station had been in operation up to and including the 13th of April, 1906, and revolutionary changes were taking place in our gas making, on account of the introduction of oil gas and not anticipating the earthquake—but at the moment of the earthquake the owners of the Independent plant, the Pacific Gas & Electric Company, had every right in the world to believe that it was an obsolete property, that it never would again be used, nor would they have to call upon it even in an emergency; they had a right to believe this, but the earthquake destroyed the North Beach property, coal and water gas, and left the Independent station intact; 456 we found ourselves without sufficient oil gas capacity to supply the demands made upon us; as I said before, after the resumption of the use of gas on May 12, 1906, the increase in use was rapid, and it developed into a large demand for gas, very quickly, and it became necessary to start up the Independent plant. Now, that Independent plant, on the 18th day of April, 1906, might be considered a dead plant. I don't know of an instance of complete obsolescence in history, quite like that of Lazarus, when he was dead, but at the touch of the Master's hand he came to life, and was just as good as Lazarus was before; and the same identical thing happened with the Independent plant; it had to be resurrected; it had to be brought to life; of course, nobody at that moment knew that lampblack could be used for the manufacture of water gas. It afterwards developed that lampblack was a good water gas fuel, so it was applied to the Independent works and it was brought to life again, and to-day it is a good stand-by plant. The Independent plant, most assuredly, will be abandoned. The Independent plant is a stand-by plant until the end of the line marked "Construction period," and then it may be considered as abandoned, if we have no more unforeseen accidents or revolutions in the art. I did not put it on this chart as being abandoned at any point, because it is not abandoned, and for that very reason, that it was abandoned once and resuscitated, brought back to life, we simply call it inoperative. I am giving you my opinion, as an engineer, that the owners of the 457 plant had a right to consider it an obsolete plant on the 13th of April, 1906, five days prior to the earthquake. There had been many similar occurrences previously in connection with the water gas and the coal gas generating plants, which pointed to the fact that there might be temporary obsolescence; that an engineer might not even be a good judge of whether property is obsolete or

not. Many times in my experience we have had such difficulties in getting coal, soft coal or bituminous coal for the manufacture of water gas that we have had to resort to extreme measures. For instance, in 1904, we brought coal from Japan, from the Miike & Yashitani mine, and used Japanese coal for quite a while, and had that Japanese coal been low enough in price and good enough in quality, it might have made the water gas plants in San Francisco obsolete. We had a right to expect that it would, but it did not, and the same thing has happened to our oil. There was a time when the Pacific Coast Oil Company found they could not supply us with oil and the only other oil in sight was the development by the Hearst Oil Company, in Coalinga, when the Blue Goose well was bored: that was before the development of oil in Bakersfield and Midway fields, and we found that it was next to impossible to get oil for the manufacture of water gas, and while we were getting our house in order to manufacture coal gas, and expected to get enough oil to perhaps manufacture a little water gas, the vast fields at Bakersfield and in the Midway opened up, and we were also helped by the importation of the Peruvian oil by the steamer "Bawnmore." Grace & 458 Company bought that steamer and put her on as an oil carrier between the port of Paita in Peru and San Francisco, for the purpose of furnishing our company with an abundant supply of low cost oil, and it looked pretty good. It looked as though we were going to totally abandon our coal gas works, but through their ambition they sent a part of a cargo up to the Portland Gas Company, and on the way back the vessel foundered on the northern coast of California, and nobody has resumed the importation of oil from Peru. Those things have been happening in the gas business more or less regularly for the last hundred years, so that we never know enough of our own knowledge to say that any part of our apparatus is obsolete or may not be called into use tomorrow. I can imagine a condition of martial law, military control in this country, which would try to bring about a conservation of petroleum, which would compel our company to use less oil, or seek out some other way of making gas, some other crude material for making gas. If the United States Navy should require the oil output of California, of course, it would be a horrible condition that would confront us. I suppose we would have to make gas some way. I remember back in Massachusetts one winter when Boston Harbor was frozen over, and they were skating and sleighing on it, and our only coal ship that we had a right to expect was outside of this ice field, and I was compelled to make gas out of my coal shed instead of the coal, and we made a very fair quality of wood gas, enriched with some petroleum residuum, until such time as there was a thaw and 459 the ice in Boston Harbor was broken and our coal vessel could come in. That was a comparatively small works in South Boston, where the output was 300,000 cubic feet. It amounts to nothing in this day, but it was very serious in those days to us. I can imagine like conditions which would suddenly change the method of making gas and make all of our generating apparatus, our best, newest, oil gas apparatus completely obsolete.

If coal of an excellent gas-making quality should be developed in Alaska, it is conceivable that there might be a change. But the quality of that coal has not been demonstrated. It would be necessary to determine the kind of coal, whether it might be a true anthracite or a semi-anthracite, or a gas-making coking coal, known as bituminous coal, or a steam coal. Now, until a gas man knows what kind of coal it is, how much gas he may reasonably expect to get from a ton of such coal, and its coking qualities, and how much tar he may expect from it, he cannot tell whether he can use the coal. Added to that is the fact that these mines in Alaska are not yet completely connected with seaports by any railroad, and there are no shipping facilities at such seaports, no ships for carrying the coal, and after it gets here we have no gas works to make the gas. I think that is quite a hypothesis, and it is in the air. Indeed, I would have to reconstruct some sort of an apparatus for making coal gas, if that should develop. I have been up against just as hard propositions, only not on so large a scale. In 1915 we abandoned

460 Martin Station and have treated it as non-operative since that time. It has since been dismantled to effect economy in the production of gas. It was inaccessible for obtaining the raw gas-making materials, for getting rid of waste water and drainage, and getting salt water for scrubbing. In the first place, gas works must be started right. In the event of its having been started wrong, it is wiser to acknowledge the fault and start right some other place, than to go on and continue with the mistake on the old ground. Martin Station served its purpose, and I think it was very wise not to make a very large gas works of it.

In 1915, I brought into use the two new Jones sets, one in May and one in July. Those units had a very much larger capacity than the old units. The new sets did something further, they economized ground space. In 1891 North Beach works was built because the Howard street works and the total Potrero Coal and Water Gas plant would not produce the expected 4,000,000 cubic feet maximum output, which the company's engineer had a right to expect within a year or two, and it was believed that, with the knowledge then existing, the Potrero Station never could be made to yield as much as 4,000,000 cubic feet; that it was necessary to have two gas works. So the North Beach plant was hurriedly completed and the Howard Street works abandoned.

The North Beach and Potrero works combined had a capacity which would take care of the city for several years to come; but at that time the Potrero Works never turned out much over 2,500,000 cubic feet a day. But with the improvements in oil gas manufacture and the reduction in ground space required, I believe that the ground at the Potrero works is sufficiently large for the making of 40,000,000 cubic feet of gas in 24 hours, provided it is all oil gas by the new process. The increased capacity and efficiency of the works at the Potrero works as the result of the construction of the two new sets, made it unnecessary to maintain Martin station, and a greater economy lay in operating the new sets and in abandoning Martin station. The relationship between ground

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space required for different ways of making gas is one-quarter acre per million cubic feet of oil gas; one acre per million cubic feet of water gas; two acres per million cubic feet of coke oven by-product gas, and four acres per million cubic feet for coal gas, modern methods. There is nothing more, I fear, that I can present at this time, tending to illustrate and to make clear the meaning of obsolescence as applied to the manufacture of gas, and the apparatus used in that manufacture, without the danger of repetition. I sketched over it this morning.

Mr. Bosley: If your Honor please, for the purpose of making our position entirely clear upon this, I desire to say that I am offering this testimony of Mr. Jones, and I propose to follow it up with testimony taken from the financial records of the company, to show that each new invention, each advance in the science or art of gas making, should justify itself under the facts and conditions existing at the time. I have completely abandoned the idea that obso-

462 lescence is something in the nature of a contingent risk for which provision should be made on the insurance basis, that is, by estimating some amount to be set aside each year as a reserve for the purpose of providing for replacements due to obsolescence. I think, on the contrary, that each new invention, when it comes, must justify itself by its own economies as applied in practice, and that we may have many different degrees of improvement or increase in efficiency of different parts of the plant. A certain degree of improvement in efficiency may justify the erection of a new plant along new lines, but it requires a far higher degree of increased efficiency to justify the substitution of a new plant for a part or all of an existing plant. In the latter case, the increase in efficiency must be such as to justify making the additional capital investment and the abandonment of the old. The owner of the plant can make no profit out of the substitution of a more economical generating plant until the economies and savings effected by the construction of the new plant have enabled him to amortize his previous investment in the plant which is abandoned because of the adoption of the new. A great increase of efficiency is necessary to justify the owner of an existing plant in discarding what he has and putting in the new, while a much less degree of increased efficiency may justify the owner in putting in a new unit which will displace possibly a part of his old plant and leave the rest of his old plant still in use for stand-by purposes, or to carry over his peak load, and I propose to make our show-

463 ing and our claim for obsolescence entirely upon the facts which we have submitted and will submit to establish the proposition that each of these changes made has been justified by the saving effected, and I shall claim that the owner is entitled to retain for his own use so much of the savings effected by the adoption of the new method as may be necessary to amortize the investment in the plant and property abandoned as the result of the adoption of the new until the entire amount is amortized; after that, the owner begins to realize a real profit, and then it is time for the owner to consider the sharing of the advantages of his new invention or his new process with the public, who are the consumers, although

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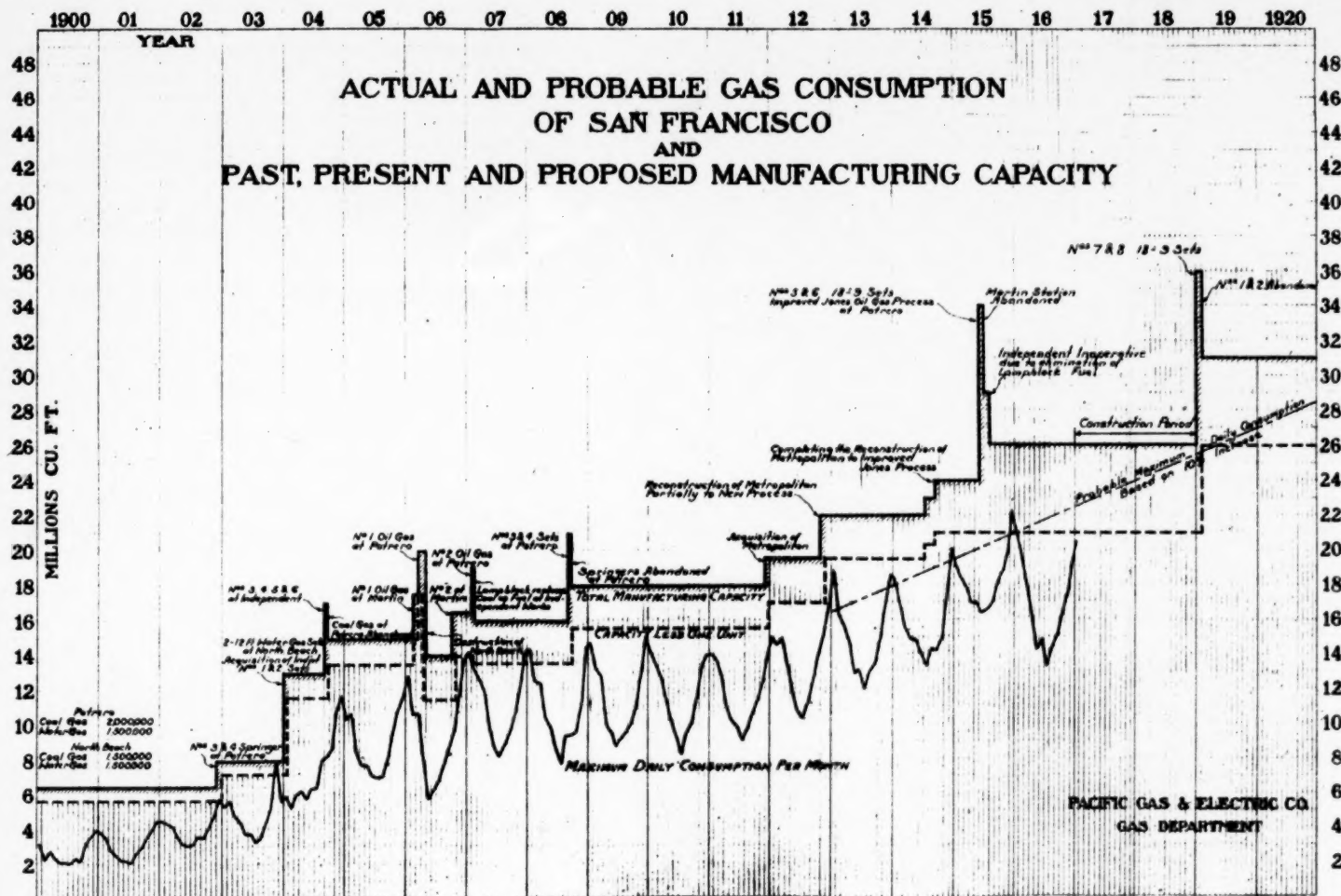
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ACTUAL AND PROBABLE GAS CONSUMPTION OF SAN FRANCISCO AND PAST, PRESENT AND PROPOSED MANUFACTURING CAPACITY



it might be that the owner, anticipating a reduction in rates which he can make because of the new method, will find it worth his while to lower the rates and increase his sales and increase his net profits; but he really gets no actual net profit from the change until he has entirely amortized the investment in his plant that is discarded or abandoned as a result of the change; and it is along that line that I expect to proceed further in this case. I might say that the method of treating this subject is new to me at least, whether it is new to others or not, and it will involve a very considerable study of the accounting statistics, and the auditor's office requires a little time for the completion of that work. A good deal of the work has been done in preparation for that showing, but the auditor cannot get the information all gathered and properly arranged for some days. I will ask that this chart that has been testified to by Mr. Jones be received in evidence and marked as "Plaintiff's Exhibit No. 44." A true copy of this chart is here inserted.

(Here follows chart marked page 464.)

465 Mr. Jones resumed:

I have made a study of the prices during the year 1915 and the first half of 1916, for the purpose of ascertaining what would be the value of the property appraised by me as shown by Exhibit No. 3, if the same were appraised on the basis of the average of prices during the year 1915 and the first half of 1916. This statement shows the appraisement of the properties covered by the appraisement in Exhibit No. 3, but applying the average prices during the year 1915 and the first half of 1916.

Mr. Bosley: Now, in offering this testimony, I am offering it for two purposes, and two purposes only. The first is as a foundation for making an estimate of the cost of maintenance and replacement during the period involved in this litigation, and second because of its bearing upon the question of the present value of the property during the period in litigation, and in support of our claim that for the purpose of determining the reasonable rates which the plaintiff is entitled to receive for its gas, the appraisement made as of June 30, 1914, as set forth in Exhibit No. 3, should not be diminished because of any deferred maintenance and replacements or because of certain items which the defendant has claimed should be deducted from that valuation, as, for instance, because of the duplication of mains, or any question as to the amount of paving that was laid by the company, and the other matters that were covered by Defendants' Exhibit No. 10. I will ask you now, Mr. Jones, if this

466 statement which I have shown you really shows what, in your judgment, would be the cost to reproduce the properties which were inventoried and supplied in Plaintiff's Exhibit 3, if those properties were to be reproduced on the basis of the average of prices prevailing during the calendar year 1915 and the first part of the calendar year 1916?

Mr. Jones: These prices were not taken as of a given date during 1915 or 1916, they were at various dates. I have a method of keeping cost books with various prices, and I have done so ever since I have been in the habit of making appraisements or anticipating being called to make appraisements. I took the prices from those books showing the average prices prevailing during 1915 and up to June 30, 1916. Of course, we did not have any minimum charge prices. The key to this is on page 12 and shows that some material did not increase in price at all, and during 1917 some of those same materials have almost doubled. I believe that glass is shown as not increasing at all in price.

Statement produced by Mr. Jones, showing the cost to reproduce in 1915 and 1916 the properties covered by the Jones Inventory and

467 Appraisement, is admitted in evidence and marked "Plaintiff's Exhibit No. 47." In this Exhibit (No. 47) the increase of the average of prices of materials during the calendar year 1915 and the first half of the calendar year 1916 over the average of the prices used in preparing the inventory and appraisement (Plaintiff's Exhibit No. 3) is shown on page 12, a true copy of which is as follows:

Average Increase of 1915 and 1916 Over 1914.

	Increase.
Lumber	20%
Brick	None
Galvanized Sheet Iron.....	29%
Paint	None
Cement	None
Glass	None
Electric Wiring.....	25%
Electric Motors.....	17%
Engines	50%
Pumps	50%
Boilers, B. & W.....	37%
Boiler, Stirling.....	52%
Compressor	29%
Pipe, Wrought Iron.....	16%
Pipe, Cast Iron.....	8%
Tank Steel.....	22%
Building Steel.....	41%
Tool Steel.....	40%
Cost of Services.....	3%

The result of appraising the properties covered by "Plaintiff's Exhibit No. 3," on the basis of the average of the prices prevailing during the calendar year 1915 and the first half of the calendar year 1916, is shown on page 13 of said Exhibit No. 47, a true copy of said page 13 is as follows:

Final Summary.

Potrero Station.....	\$2,097,138.60
Independent Station.....	569,684.20
Metropolitan Station.....	679,688.33
Martin Station.....	578,147.36
North Beach Station.....	305,556.50
468 Distribution	9,612,568.70
Miscellaneous	207,267.75
Total	14,050,051.44
E. C. Jones' Appraisalment, June 30, 1914.....	13,108,165.89
Increase	941,885.55
Average Total Increased Cost.....	7.18%

The abandonment of Martin Station was made practically as of July 1, 1915. It was on the starting of the second improved set. Considerable has been realized from the material that was in that plant. Portions of the plant were removed and installed in other gas works of the Pacific Gas & Electric Company. One of the

200,000 foot gas holders was moved to Sacramento. The generating sets and buildings containing them were partly removed, and will be wholly removed to Fresno, to become a part of the new gas works at Fresno. The 1,000,000 foot gas holder at Martin Station will also be removed to Fresno to serve as a storage holder at that place. The cost of recovering the material at Martin Station up to this time is \$6,622.13. On the second page of the statement (Exhibit No. 77) I have entered, first, the value of Martin Station as appraised by myself on June 30, 1914. Opposite the amount of that valuation there is a larger amount, which represents an addition of 7.12%—that is the amount that Mr. Vincent used in his ascertainment of the value including the overhead. My portion of this statement is contained in the first column, under the heading, "Jones Valuation," and that sum is simply the figure that is given there plus 7.12%, and below that I have entered the amount realized by salvage
469 and also indicated the amount of the cost of recovering salvage, and that gives a net amount. The net loss, due to abandonment of Martin Station, under the heading, "Amount to be Amortized," is \$293,221.89, and with the additional percentage allowed for overhead it would be \$326,879.96. That was carried in the Jones appraisal at actual cost. The additional estimated percentage of Mr. Vincent's was not included in the cost as taken from the books. The cost as I gave it was the cost as I knew it. I knew nothing about these additional overheads. My estimate was expressly stated to be exclusive of overhead, interest and administrative expense. The figure of \$186,000 odd is made up from the actual prices placed on the different portions of the plant that have been removed and transferred, taken from Mr. Butler's books, Mr. Butler being the auditor of the San Francisco district. My understanding is that the articles entered there were transferred at cost. The \$186,000 is made up in this way: \$109,504.01 is taken from Mr. Butler's books, the auditor of the San Francisco district, of items actually transferred and priced on his books at cost, if I understand it. \$76,622 is my estimate of the material that is to be moved from Martin station to the new gas works at Fresno; and the 200,000 foot gas holder now moved and in operation at Sacramento; and the oil tank that will be moved to the Oroville Gas Works. That added to the \$109,504 makes this total of \$186,126.01. The figures embodied in the \$109,000 item were all figures that were appraised by me.

I do not know whether Mr. Butler's books agree with my
470 figures. My understanding has been that Mr. Butler and Mr. Bridges both used the Jones appraisement at the present time. The oil meter mentioned here, \$45, that is the figure I put in my appraisement, as I remember it. It is only an assumption on my part that the books are correct. This statement has not been compared with my appraisal.

Mr. Bosley: I expect to offer testimony, if your Honor please, by Mr. Bridges to show the manner in which charges are made for items of property transferred from the San Francisco district to other districts. My understanding of the situation is that whenever an article is transferred as a whole from this district to any other

district it is transferred on the basis of the cost as it appears on the books of the company without making an appraisal to provide for a deduction of the accrued depreciation. I don't know how far the J. G. White appraisal was used as a basis. Where they had costs, I understand that the cost was used as the basis. Where they did not have costs, they had to resort to such information as they found available. The White appraisal is very nearly the same as Mr. Jones's. I think the total was a little under, but not very much.

I expect to offer Mr. Bridges' testimony, as to the way in which the transfers are entered. This testimony that I am offering now has two bearings, first, with reference to the amount of the obsolescence charged, and second, with reference to the present value of the invention covered by the Jones patent. You will remember we offered

testimony as to the probable savings to be effected in the
471 future during the life of those patents. It is my belief that the amount of property that is rendered obsolete and that has to be disposed of or abandoned as the result of the adoption of the new process must be deducted from the total savings to be effected by the new process, in order to get at a fair estimate of the net amount of the savings.

Mr. Jones resumed:

I have made an estimate of the property to be abandoned at the Potrero station, as a result of the adoption and use of the improved process and apparatus covered by the Jones patents. The construction of two 18 foot 9 inches improved Jones sets at the Potrero station, which are now authorized and will be in commission during the end of 1918, will permit the abandonment of the Independent station. The first page of this statement covers the value of the abandoned property. The total appraised value of the Independent station, as taken from my valuation, is \$492,476.36. Deducting parts in use and to be used, the oil tank, \$9,172.77, and a 1,000,000 foot gas holder, \$102,810.95, making a total of \$111,983.72, of apparatus that is in use and will be used in connection with the Potrero gas plant indefinitely, and that deducted from the valuation of the Independent plant leaves \$380,492.64. From that I have deducted a salvage of a 500,000 foot gas holder, estimated at one-half of the value, \$31,836.36. These estimates are by myself, and one-half the value of a set of purifiers, \$20,435.54; one-half the value of yard mains, \$21,701.28; and incidentals, \$10,000, making a total of \$83,-
973.18 for the value of salvage from the Independent station;
472 that deducted from the above amount of \$380,492.64 leaves \$296,519.46 to be amortized. That would be the net amount of obsolescence loss. The two columns to the right are simply the same items, with the addition of the overhead charge as computed by Mr. Vincent in his previous testimony. I do not know anything about his not having computed overhead on the incidentals. The incidentals were intended to cover the small portions that would be salvaged, but it was impossible to make a list of them or an exact esti-

mate of the value. The additional overhead on the incidentals which include junk and small items would be only \$71.00.

The construction of two 18 foot 9 inch improved Jones sets in 1920 will permit the abandonment of the four 16 foot old Jones sets at the Potrero station. The appraised value of the four old Jones sets was \$224,035.22. Deducting four primary scrubbers and connections, \$12,000—those will be continued in use—and salvage \$28,000, making a total of \$40,000, which, deducted from the appraised value of the four old Jones sets leaves \$184,035.22 for the amount to be amortized for the old Jones sets at the Potrero station, and that added to the amount to be amortized at the Independent plant makes a total of \$480,554.68 as the total for the Independent and the Potrero stations. The two columns to the left are the corresponding items with the 7.12% overhead added. That amounts to \$517,475.78 as computed by Mr. Vincent. (This statement is offered in evidence by Mr. Bosley and marked "Plaintiff's Exhibit No. 77.") I do not at the present moment know of any other part of the plaintiff's gas generating plant in San Francisco that will have to be abandoned or displaced as the result of the further
473 installation of new apparatus under the new patents, using the new process, than those I have listed in this statement, that is, I cannot anticipate it at the present moment.

A copy of "Plaintiff's Exhibit No. 77" is as follows:

474 The Construction of Two 18' 9" Improved Jones Sets at the Potrero Station, which are now authorized and will be in commission during the end of 1918 will permit the abandonment of the Independent Station.

Including total overhead—adm.
expense 4%, interest during
construction 3%, compounded (7.12%) .
..... \$527,540.08

Total appraised value of Independent Station..... Jones' valuation. \$492,476.36

Deduct parts in use and to be used:

Oil Tank \$9,172.77
Holder (1,000,000 ft.) 102,810.95

\$9,825.87
110,131.09

119,956.96

111,983.72

407,583.72

Salvage 500,000 ft. Holder 1/2 31,836.36
Purifiers 1/2 20,435.54
Yard Mains 1/2 21,701.28
Incidentals 10,000.00

34,103.11
21,890.55
23,246.41
10,000.00

83,973.18

89,240.07

296,519.46

318,343.65

476 Mr. J. D. BUTLER, a witness called by the plaintiff, testified as follows:

I am sixty years of age. Reside in San Francisco, and am the auditor of the plaintiff in its San Francisco district. Prior to occupying my present position, I was the auditor of the San Francisco Gas & Electric Company. I furnished to Mr. E. C. Jones, for his use in preparing Plaintiff's Exhibit No. 77, a statement of items of realized salvage from Martin station, and also a statement of the cost of recovering salvage. The aggregate of the items of realized salvage was \$109,504.01, and the actual cost of recovering the salvage was \$6,622.13. These statements which I furnished to Mr. Jones were prepared directly from the books of account of the plaintiff kept in its San Francisco district, and are correct.

On cross-examination, Mr. E. C. Jones testified as follows:

As far as my knowledge goes, the amount to be amortized is my value of the property less the parts salvaged and the part transferred. This statement is all I know about it. I don't know anything about whether a part of it has already been written off.

Mr. Bosley: It appears from the previous statements put in evidence that the Martin station plant has been written off as a whole. This statement is intended to cover the total amount to be amortized as of the date of Mr. Jones's inventory and appraisal covering everything for the future.

477 Mr. Searls: Of course, your estimated depreciation allowance, which was based on Exhibit 58 was in turn based on the estimate which accompanied the complaint and the affidavits in this case, which, in turn, were based upon consideration of the obsolescence and depreciation of these very properties as shown in the exhibits accompanying those papers; so you have included in the allowance which you have taken into account for the past years a portion of this amortization. Isn't that correct?

Mr. Bosley: I think the only place where there might be any duplication is where Mr. Jones testified to the amount of the accrued depreciation. He included a considerable item for accrued depreciation at Martin Station as of June 30, 1914. There probably is an overlap as between that and this present statement, Exhibit 77. I think we have asked for no allowance for depreciation on property that is already abandoned, but this property was not abandoned on June 30, 1914. It was only placed on the abandoned list at the beginning of the fiscal year, July, 1915, that is, I mean the Martin station part of it. The rest of this is not yet abandoned, it is still in use, according to the testimony. There was some estimate of accrued depreciation covering that part of the property as well.

Mr. Jones resumed: With reference to Exhibit 77, the estimates of the salvage value contained on the first page were entirely made by myself. I testified that I got those figures, with reference to the

Martin station, from the company's books, from Mr. Butler, the auditor of the San Francisco district. I have not compared them with my appraisal. I am not a good judge of what the market value of a plant would be. I am a very good judge of the service value of a plant. It would be quite impossible for me to answer the question of whether there is any difference between the service value of a plant and the market value of it. My answer to the question of whether I think there is a distinction between the present market value of the physical plants, without consideration, of course, to intangibles, and the service value of the plant to the company, would be, that I consider the service value to the company, because my idea of market value has been somewhat shaken by my experience with changes in the art and salving—the scrapping of apparatus. For instance, a gas holder may have a service value of 100% today and tomorrow it may cost something to fill up the hole in the ground where the gas holder was removed. I believe it is the service value of the plant that should be considered, rather than the market value. It is the use of it that makes it valuable. To carry my illustration a bit further, I might have a plant, like the Independent station, which I have in such condition that it could be livened up and put into service if necessary, but which I confidently expect to abandon in the course of a year or two; it is kept in that condition today, ready for use. My idea is that the plant would have to be used for the exact purpose for which it is intended, as a part of the equipment, to have the value that I placed upon it. I can imagine a condition where it would be simply a pile of junk, and that it would bring the market price of junk, although it might be in good condition, and make gas fairly economically. I believe a prospective purchaser today would be so glad to have it as a safeguard, that he would not stop long to consider it. By that I mean the purchaser of the whole plant. He would be glad to take the Independent and the four old Jones sets for the purpose of safe-guarding his service to the public, and he would not question whether it was good, bad or indifferent. In order to answer the question of whether a purchaser would have to pay the reproduction value new for the plant, or would he consider that, in order to keep his plant efficient, he would have to discard that in the course of a year or two and substitute new and improved processes for it, I would have to admit that I am under the influence of present conditions brought about by the war, and by the conditions at our works, our inability to get new apparatus, and our inability to get tangible promises to furnish new apparatus. I would also have to consider that the prospective purchaser would have in mind the profits to be derived from the new apparatus, and a process which would be attractive to him, and also the fact that if he did not have the Independent and the Potrero works, he would be unable to repair the two improved units, and either one of them or both of them may fail at any time and he would be without apparatus, so I would have to answer the question in this way, that the prospective purchaser would probably be willing to pay the appraised value for that ap-

480 paratus in order to have it today. By the appraised value I mean the value I placed upon it. The prospective purchaser having the anticipated profits from the new process, and being granted the right to use the new process, which is the essence of it, could well afford to pay the appraised value as I appraised it for the Independent plant and the old Jones set. I believe that any prospective purchaser would be willing to pay it. If the gas company was selling its gas plant with a view that it was apparently going to become useless and dead in a short time, then it would be a question of selling it as junk. If it were to be transferred to some other gas company for use, for a limited time, instead of use for the normal expectancy of life it would otherwise have, and in its present location, it seems to me that would be wholly between the buyer and the seller. It would be a matter of bargaining. But I would stand out for the value of that property. As it has proven by the test of time, the property is worth today to us the amount that appears in my appraisal against it. It was absolutely worth that much in June, 1915, because it is worth no less now. It has been in condition for use and is now ready for use. So far as market and exchange values go, any portion of my plant would be worth the reproduction value in exchange, irrespective of the nearness of the time when it would be discarded through obsolescence or inadequacy, if the plant is necessary for use—for serving the public. Many things today are worth twice what they were at that time, because of the inability to get them. People are willing to pay two prices to get material that is essential to the service of the public. A purchaser would 481 not be taking a very large chance in paying such a price for the plant, in the light of the relatively short period of utility which that particular set of structures had left, if he looks across the yard and sees the profits that will accrue to him from a new process, assuming that he has purchased the right to use the new process. If he could get it for less than the reproduction cost, he would undoubtedly make still more profit, but I don't believe he could get it.

Mr. Searls: Suppose you had a system of mains which had become so expensive to maintain, and so inadequate for their service, that it would be necessary to replace them with other and different mains within a very short period—by that I don't mean simply adding additional mains, but replacing the existing ones within a very short period, much less than the expectancy of life which would arise from a survey of their physical condition, do you think that your prospective purchaser would pay full reproduction value as of any of the years in controversy here for those mains? I am not saying that you have such a thing, necessarily.

Mr. Jones resumed: Good housekeeping would prevent such an occurrence. That is, if an engineer believes he has a condition existing like that in his distribution system, it is his duty to remedy it. We are constantly remedying those things every day and keeping our system up to as nearly 100% as we are able to, and within human power. In turning a property over to a prospective purchaser I would consider that we were turning it over in 100% 482 service value as nearly as we can keep it that way. My ad-

vice to a prospective purchaser, to pay 100% reproduction value for the mains, would depend on how much he wanted the plant and for what service he wanted it. With reference to a prospective purchaser wanting a plant, if he can get it for what it is reasonably worth, and desiring me to inform him of the said reasonable worth, I have taken that up in my appraisalment. I believe I stated to this court that that appraisalment covered property placed at a value that I thought it was worth to a prospective purchaser to pay for the purpose of making gas. I believe the prospective purchaser should pay the appraised value of that property, unless he is making a dicker to buy junk, or part junk and part useful property. If the house-keeping should be bad and the plant should run down, then an entirely different condition would arise. Then the purchaser, in dickering for the property, would try to get it cheaper, and he might or might not, it would all depend upon how much of it he wanted, and what he wanted to pay for it.

My understanding is that by good housekeeping, it would be possible for the company to always keep its plant in 100% condition up to the point where it absolutely abandons structures as having become no longer useful, and can obtain 100% value in exchange for the structures as they exist. If a plant is kept in good condition and improvements in the art are adopted as fast as they become known, and economies are practiced and attention is given to painting and keeping up the property—barring one thing, and that is the death of a piece of apparatus, or a machine, which cannot be prevented by upkeep, care and maintenance, as there is a gradual death going on in every sheet of metal and in generator shells, which is not visible—my opinion is that property is worth its appraised value if the upkeep and maintenance on it are right. The service of a particular part of a plant which is under inspection is just as good after the expiration of a large portion of its life, as it was at the beginning of that life. In running or moving machinery the repairs are so well attended to, and the bearings are kept tightened up, and the babbitting kept in such shape that it is always new. I have used that story about the boy's jack-knife over and over again. The boy gets a new blade in it this year, the next year he gets a new handle, and yet the essence of the knife is still there, it is the same knife, so far as the boy is concerned, and yet there is not a part of the original jack-knife that the boy owned; and that is true of the larger proportion of the physical properties of a gas works. But I don't want to be understood as saying that a portion of that property, such as certain sheets of a gas holder, or the columns of a gas holder, will not die some day. I believe I have testified that that could be cared for as deferred maintenance, aside from the regular maintenance for visible deterioration and upkeep. I don't know how I would take care of the deferred maintenance. That is a matter of bookkeeping. If you are going to provide a certain amount of maintenance per annum for upkeep, repairs and maintenance of the plant in 100% service condition, as far as an engineer can see and do it, then something must be laid aside for the providing of a new structure—a gas holder—when it

finally dies; that is liberal maintenance. A liberal amount of maintenance would take care of all of those things. A certain amount would undoubtedly have to be set aside annually to care for the ultimate amortization of some portions of the plant. I cannot imagine a condition where, if I had paid full reproduction value for certain structures and then found I only had ten years' life and only a sufficient sum left to amortize half of the life—what would I do with the other half that already had gone and been amortized to the old company. It is beyond me. At the present moment we have not a plant in the system that is not worth more than twice the appraisement of it. You can't get away from the present moment. What has happened could not be foreseen three or four years ago. I am trying to show how futile prophecy is, even on the part of a lawyer or an engineer. It is so up-set by actual happenings. I will give you a personal opinion as an engineer, that with the approaching war and taking my appraisement as a basis of value, and the promise of reward or extra profit from the new set, that he would be a wise purchaser who would pay the face value of that appraisement for the property and ask no questions—unless he had powers of confiscation; taking the depreciation fund also, whatever there happened to be, and deduct the deferred maintenance. Of course, that is a rough way of answering, but that is the way I feel about it—he would be getting a bargain; of course, I am assuming

485 that a man knows his business, knows what he wants, and why he wants it. He ought to know how much he should pay for it before he buys it. If he could see the advantages of the new way of making gas, he surely would become blind to any apparatus that was a little bit run down, or that was not going to be worth anything to him in a year or two. A bridge that carries a man over it is a mighty good piece of apparatus. You don't stop to think of depreciation after you have gone over it. It is not my position that, if a man perceived from a scientific point of view that a certain piece of the plant was logically not worth more than 70 or 80% of its reproduction value, but still, taking it as a whole, could make money enough, he could afford to pay the reproduction cost new. To the purchaser who looks upon property as a necessity to the operation of his business, to safeguard his service, it will have a 100% value, and he will be glad to pay for it. I still believe, as I testified a long time ago, that in the event of any improvement in the art, the profits from the improved method ought to be permitted to amortize the displaced property. That would take care of it. As far as physical deterioration goes in the plants, that can be practically all obviated by upkeep, by maintenance. We can renew sheets and generators and cast iron parts and moving machinery, piping and lining and keep that sort of apparatus permanently new.

I don't know that if my company were allowed its proper maintenance expense, it would be unnecessary to have any reserve
486 whatever for physical depreciation. That goes beyond my ken. But I will say this, that I could take the Independent plant or the four old sets and by a proper maintenance I could keep them under repair and make gas for a thousand years. They will

always look the same to you. If the roof blows off, or the side blows off, that makes no difference. I don't call that a part of maintenance. If you are satisfied with that method of making gas, and with the results of that method it is all right, but we have not been. We have been reaching out and adopting new processes, new ways, and we have experimented, and we have taken expensive chances, and fortunately won. We might have failed, but we have not. We have succeeded now, and I believe that having succeeded and having this new method of making gas that that would affect the mind of the prospective purchaser more than any lack of paint or polish on a piece of apparatus across the street, which he knows he will need until such time as I have shown that that will become obsolescent by the introduction of new apparatus. I would have to know on whose judgment it was determined that a certain piece of physically deteriorated apparatus was dying. I have already stated that I would be very glad to keep alive and keep practically new any piece of apparatus, I don't care what it is, if I am allowed proper maintenance to keep it up. I saw in an English journal this interesting bit of news, "The first dry gas meter patented and made by us—that is Thomas Glover and Co. Limited of London—in 1844. We illustrate this meter from a recent photograph. After long and useful service we overhauled it, and it is now in good working order.

Since making this meter we have had 72 years of experience,
487 and have made and sold meters totaling nearly 2,000,000.

The majority of dry meters made to-day embody the important principles contained in our No. 1 meter." Now there is a picture of the first dry gas meter made in the world, in 1844, and it has every appearance of being a new meter, and it is probably a good deal like the boy's jack-knife, but within a very short time that meter was in service in the City of London, and Glover & Company took it away from one of the companies and used it as a curiosity. That is true of apparatus right straight through all gas works, and when I hear people talking about lives of apparatus, they are usually young men who have no knowledge of the life of apparatus; they are men who make rough guesses of the life period of the different parts of machinery that they know nothing about, and it comes on down to theory. If I answer any question I want to have the answers based on actual experience—what I know about the life of gas machinery. Gas meters never wear out and have to be entirely replaced by new meters.

I have not taken a gas meter made in 1844, but after five or six or seven years in use, according to conditions as they exist to-day, or ten or fifteen or twenty years' use, according to the conditions that existed thirty or forty years ago, and taking the meter out and repairing the necessary parts, renewing the diaphragms at one time, and repairing the case, and the next time it is removed it will perhaps need a part of a new case, and perhaps a new index box, a new valve seat and valves, and by a rotation of the repairs, the meter is constantly new. It never wears out. Now I believe that this

first dry gas meter used in the world could be put back and
488 used, and watched and kept repaired, and last a thousand
years.

On page 2 of Exhibit 43 I have an item, "Replaced and Abandoned Meters," apparently for one year—\$27,019. That means that the cost of repairing the meters was too great to be warranted; that is it would cost them more to repair the same than it would to buy new meters, owing to the fact that meters are made in factories in the East by skilled help and in large quantities, and that a meter that comes in out of a fire, or has been run over by a truck, or abused by a consumer, I imagine, it might not pay to repair same. It might be condemned rather than to subject it to too expensive repairs. It is a matter of dollars and cents. In the case of these meters, I believe that any of these meters, that were of a proper size, that is, 5 light or over, that were abandoned scrapped, might have been repaired, but it would probably cost more money to repair the same, than it would to buy new meters. I don't know whether a gas meter has a practically limited life. The \$27,000 worth of abandoned and replaced meters means that these meters have been repaired and repaired, and through some accident or bad management of some kind on the part of the meter repairers it has become necessary to replace them. I have an idea that many of those replaced and abandoned meters were of a small capacity, that is, they were what we call three light meters, and we displaced those by five light and others. There are cases where a person would be justified in condemning meters rather than to expend a large amount of money on the repair of those meters. There are \$27,019.58 worth of such cases in this exhibit, for one year. It might

489 have cost us \$85,000 in three years to have made these meters new in our own shops, with our insufficient help and insufficient shop room for handling that sort of thing on a large scale, and the fact that repair parts over a certain percentage cost more than the whole of an article bought new from a factory where it is made. One meter may have a life of 50 years, and another a life of three years, like a man, but we can say this, we have evidence here in this exhibit that there were \$27,000 and over of replaced and abandoned meters in that year. Now that was due to the fact that the meters were beyond the point of repairing economically, or were of inadequate capacity. That is part of the regular maintenance of a gas works and distribution plant. I have found it so that the same principle governs practically every piece of machinery or structure in our gas works. It does in practice, bearing in mind always those portions that it is impossible to note visibly the deterioration. I took the appraisalment in Exhibit 43 as of June 30, 1914, and at this later date, due to changes in the art and adequacy and so on, I estimated the accrued deterioration and the expected abandonments and replacements, and listed them as shown in this exhibit. Take the old generator building, for instance. We will start at the beginning. The redredging required every three years. It did not take much dredging, but that had to be done. The abandoned separator and hoist in front of the generator house was practically obsolete, due to the changes in the art, and we wanted the room occupied by it for other purposes. It had served its purposes and was maintained and was in good condition, but we took it out.

490 With reference to my study—"Expected abandonments and replacements as of June 30, 1914"—I expected that abandonment on June 30, 1914. I knew it must be coming, because we were working on a new process and it has to come. That location was needed for scrubbers in connection with a new process, and is now occupied by those scrubbers. I can imagine some sets of purifiers that we may see fit to abandon, which were not included in this exhibit, because we can get perhaps more capacity and less ground room. It would not be ordinary inadequacy, but due to improvements which we are making in purification. We may be able to get five times as much capacity to a square foot of real estate. In a gas works where we are crowded for room, it would be wise to abandon purifiers that were in good condition and adopt a new way of purifying gas and economizing room. That I anticipated. This is something actually going to happen I believe and hope. I can't imagine the probability that there are structures, which due entirely to physical deterioration, will be abandoned within a few years. I believe, my judgment today, as to the abandoned structures which may reasonably have been foreseen in 1914, is that it includes everything that the plant is likely to abandon within the next five, ten, fifteen or twenty years, with the exception of these purifiers that I mentioned. We have got to make changes in order to economize ground room. At the Potrero station we are anticipating increasing the size of the works to such an extent as that it would probably make more gas per square foot of area than any gas works in the world, perhaps three times as much as any gas works in the world.

491 In order to do so we have to condense our apparatus, and if we should see fit to remove the whole block of purifiers, or make changes—it is like playing checkers—in order to permit us to accomplish the result, it still does not change what I have said about these same purifiers lasting indefinitely by proper maintenance.

I am not prepared to say that the company will not abandon any meters within the next few years. It would be unwise not to abandon meters that are so far gone that it would cost more to repair them than buy new ones. There may be a meter far gone today, but when you take it down and it is repaired, its life will be renewed, and it will be put back in service again. Most assuredly, there are some meters which are going to be abandoned in the future. They are on their way toward abandonment, if you define the limit when they are going to be abandoned, but we might fool those same meters that think they are going to be abandoned, by taking them out and renewing them so that they will be new meters and go back into the game again and have to live like the Wandering Jew—another fifty years. In my exhibit allowance was made for those meters that I will not be able to fool, by the actual fact of \$27,000, which we were compelled or saw fit to expend in one year for the replacement and abandonment of meters. Most assuredly, we are going to make allowance for the replacement and abandonment of meters that are to come within the next few years. You have got to allow the average of what it has cost us for these different years for the

necessary maintenance and repairs and replacements of meters.

They ought to stand 100% up to the minute I take them out.

492 It is the general habit of a gas meter to work for the consumer after it has been in use a little while. They invariably go slow. I have never known a gas meter to go faster than any of the ordinary limits of a gas meter, so they are working for the public, until we find that it is for our interest to take them out and repair them and set them right again. Sometimes they overdo it. I believe the difference between what it is worth and new, as regards a meter that will have to be taken out within the next two or three years and a brand new one would be more than offset by the amount of calculation, bookkeeping, auditing and cost of keeping figures. I believe that we could afford to say that it is new until we took it out and added it to that \$27,000, or maintained or repaired it fully and put it back into use again. The cost of theorizing would make up the difference. I would make the same statement with reference to the physical condition of a meter that is 100% up to the day that it is taken out and abandoned as junk, and all of a sudden it drops to about 1 per cent, or whatever the scrap value may have been. If you are going to allow me sufficient maintenance to keep that meter new, or replace it when it wears out, call it by any name you like, I have got to have that. I have got to have it to preserve the service. I expect to have enough money from my rates set aside in some sort of a way to either repair or replace the meter that is going to die. I do not see why the present rates should not take care of the apparatus that is making gas. It brings the return that we call rate. Why can't it pack its own load? I don't know, if I were buying a plant and carrying a depreciation reserve along

493 from the time that I acquired it, that unless I bought the depreciation reserve that had accumulated also, that I would be going to get badly stuck, with respect to the units which die in the immediate future, from physical causes. I have never met a man who was going to buy a gas works, and I have no respect for sinking funds and reserves and all that sort of thing. I believe the only place we get money is from the consumer, and the consumer must pay enough money to properly maintain our plants and keep them in 100 per cent service condition, and give us a profit, and the rate must include all of that. Whether you put it in one drawer or another, when you take it out of your till, and repair your meters, the consumers must pay that money, and it must be included in the rate. Why not consider the company as a living entity, something we are going to use ourselves and not sell—to make gas and sell it, and make money out of it. I cannot look at a gas works in any other way.

A structure is worth what its uses warrant. That is, a gas works that is properly protected by rates, and which is regulated, carries with it protection, and has a built up business, consumers that have been taught how to use gas at a great expense with the teaching, and is using more modern methods in making gas, and has reasonably priced crude gas making materials, that gas works is worth a certain amount of money. Take away any of those items and

you make it worth less money, and you take away its business. Very few gas works in the olden times had any scrap value. You will understand that a gas holder may cost \$100,000 to erect, and in time when junk isn't worth much money, as it was before the war, it would cost the entire salvage of the steel work of a gas holder to take it down and fill up the pit in the ground, and make a piece of land salable, so that it could be disposed of. That is the difference between a gas works in use and protected by proper rates and without competition, and a gas works that is out of use. Undoubtedly there is a basis of value on which those rates can be computed in order to maintain the plant at all. I do not see how you can interject the word exchange into a rate making case, because it is a living gas works. A gas works is working and it is not a thing that is going to be sold or exchanged, and its whole value depends upon the condition of its physical properties, the amount of skill that is used in the operation of them, and the treatment it gets from the public and governing bodies. If nobody wants anything it has no value whatever. A gas company's value depends entirely on those items that go together to make value. A gas company's business can be protected and its life assured in terms of money, because it has a struggle for existence—its life can be protected and assured so that every stockholder feels that he is an owner in the property. We ought to have our gas companies in this state to-day so attractive an investment that the consumers and the public, everybody, that their ownership and stock in that company would prompt them not to ask unnecessary questions. People seem to forget that gas companies are owned by the public, and the ownership is distributed throughout the public. With reference to other items which I have included in this exhibit, such as the redredging of the berth for vessels, the old generator building, the lamp-black separator, repairs to the Browning Hoist and purifying house, they are entirely an operating question. Some of those things have been done and some have not been done. The Old Generator Building—to repair the end wall, I assume it will cost about \$3,500 to repair it. It has not been done—it is still standing up there. But if a new building was to be erected, it would have to be done. Then we could start fresh with a new building. It had not been attended to because we did not have the available money to put into that sort of work. It did not affect the service in any way.

It is a matter of judgment, whether I am allowed only a certain amount for maintenance every year, or whether my allowance for maintenance is given me by the company on the basis of what I ask them for. It has been up to the present time, that any recommendations I make to keep the property up to 100% serviceability, they always honor. They let me keep their property up for them. I did not consider it unsafe not to have this particular maintenance done immediately. It is simply that it does not look well. It does not affect the service.

With regard to the item on the second page of maintenance and up-keep of all generating plants—\$75,000—means that prior to the

new process we rechecked, using new fire brick, all of our generators and pre-heaters, and we endeavor to do it in the latter part of the summer so as to have practically new apparatus to carry us over the holiday season. The new process has permitted us to recheck our machines about every two or three years, may be four 496 years, and that was my figure of the rechecking and the minor repairs and the up-keep of the generating plant, based on the cost of the preceding years. I took two or three years and averaged them. That is just one year's maintenance. It is estimated that within the next two or three or four years it would be necessary to expend \$75,000 each year. It becomes very expensive when you get into big generating units. It would cost more than that. Since this was made up, the prices have raised, and our maintenance is more expensive. It costs more to maintain our property now than it did when we were considering these items. The expenditure of \$75,000 would be for every year. This \$75,000 looks large as a single item, but when you divide it up among the Metropolitan and Potrero and Independent stations, it does not amount to much for generating. This is anticipated maintenance, rather than deferred. This we know of.

We will have to keep spending \$75,000.00 additional every year on those plants as long as we have to keep the generators rechecked and the plants in shape. During the last two or three years we have found that we could make our brick last longer by treating it better and we are thus endeavoring to reduce that \$75,000.00 as much as possible. You are not to conclude from that that because we have been spending \$75,000 every year that the plant or these particular items have not been sufficiently maintained. They are sufficiently maintained. This was taken from my maintenance and repair sheet for the years and averaged,—the amount of money 497 spent in maintaining generators—and in this statement I have figured that all of the generators would have to be repaired every year. Now we are trying to avoid that. All of the maintenance charges under plant are included in this study. This represents our annual operating maintenance charge. This is a segregation of one year's maintenance charges on the gas plants of the Pacific Gas and Electric Company. It is almost \$829,000.00, which is 6.3 per cent on the value of the property. There are some other items like Martin Station that were put in on a different basis and were not classed as ordinary repairs. On sheet two you will find the items with reference to Martin Station. A deduction of 30 per cent was made from the low pressure wrought iron mains and 20 per cent from the high pressure wrought iron and steel mains. These items were not based on one year's maintenance—part were based on one year's maintenance and part were not. This idea of giving an estimate of one year's maintenance charges on all the plants is the engineer's idea of it aside from the accountant's idea. I combined the engineers' judgment with the actual facts as taken from the books—the accountant's figures that he gave me, the cost of repairing mains, meters and services and the replaced and

abandoned mains. I did not deduct one year's maintenance in my appraisal. I simply estimated that at 6.3 per cent. It was
498 done with this in view that if anyone insisted on depreciating the plant—I do not know why in the world they would do it—if one man said it was worth 100 per cent service and I agreed with him, and another man said you must depreciate this plant in order to be in fashion, you must give it a value something less than 100 per cent because it is deteriorated, then I would say take this showing that I have made and deduct 6.3 per cent and call your plant 93.7 per cent depreciated value. That is to say I do not believe that the plant has depreciated at all, but if someone was unkind enough to insist that it was I would hand them this 6.3 per cent as a measure of it.

With respect to the mains and services shown on page 2 I have confined my study of replaced and abandoned mains and cost of repairing mains to the low pressure wrought iron mains and high pressure wrought iron and steel mains, for the reason that I did not know the life of a cast iron main, but I have allowed the cost of repairing them and for certain replacements and abandonments. My idea in stating "low pressure wrought iron mains in use \$288, 341.11, average age 6 years, value 70 per cent, deduct 30 per cent. of value" was that wrought iron mains in the past have not been properly protected and they are subject to corrosion. That does not

499 apply to present practice. I would not do that in the future, but it is perfectly just to do it at this time—to apply it to low pressure wrought iron mains that are in the ground.

These mains were painted with different kinds of paint, in order to get at the best kind, but now we take a piece of steel tubing and dry it carefully and paint it with a cold coat of asphaltum laid along the metal with a brush. That gives a coating of insulating paint and takes off all oil and moisture. Then we give the pipe a coating of hot asphalt. This amalgamates with the cold coat and forms a compound with the steel. If you put hot pitch on cold metal it chills the second it touches the metal and becomes brittle and it will crack off, but if you give it a cold coat of paint so that the hot pitch amalgamates with the cold paint, the heat is not conducted from this hot pitch through into the iron pipe so rapidly, the coat of paint on the pipe acts as a non-conductor of heat to a certain extent, so that the hot pitch has a chance to cool gradually and not get chilled. When we have coated the pipe with hot pitch we roll it spirally with burlap, taking great care to wrap all the seams. After it has been covered with burlap we go over it again with hot pitch and treat it the same as Egyptians used to treat mummies—you know how long
500 they last—then the steel pipe will last as long, if properly treated. Of course there is no place on that pipe stronger than the worst protected part of it and it needs zealous inspection to see that all of the pipe is properly coated.

I do not remember just how I arrived at the 70 per cent. value, it is so long ago. I know it was very carefully worked out after a good deal of study. I believe it represents my belief and judgment and idea now. I estimated the life of the low pressure wrought iron

mains in use and based it on that—on the average years. If I took a probable physical life of 20 years and applied the present age of 6 years, I would get exactly 70 per cent. or the depreciation accrued of 30 per cent. I applied this to the wrought iron and steel high pressure mains which are relatively newer, that is, the average age of these mains is only 4 years in the ground, while the wrought iron mains are estimated by taking an average age of 6 years. I have not made any allowance for the accrued depreciation in the wrought iron services because I have considered that is covered in the items above—the cost of repairing services and the replaced and abandoned services amounts to over \$51,000 a year. The wrought iron mains which are not properly protected are going to depreciate more rapidly than any kind of pipe in the ground; the services have been treated a good deal like meters and other parts for the last 100 years, and

that, as nearly as I can judge, represents the annual replacement and repairs to the number of services we have in use to-day, that \$51,000. For instance we get a report of a leak,

we dig up the ground and we find a service pipe has deteriorated through some soil action and needs replacing, and we replace it and it is charged on this account. The service next door to that one which has been replaced might have been in use twice as long or three times as long, but still it is in perfectly good condition owing to different soil conditions, that is, if you open the main at that point you might find accrued depreciation, but if you dig a little ditch out there and examine the service you would find it in 100 per cent. condition. Nobody can tell. It is impossible. But I think we have been generous in making these allowances for wrought iron mains and wrought iron and steel mains that I knew were not properly protected when they were laid, as we did not know enough about protecting them at that time. Services are protected by a coat of asphaltum paint at the present time. Formerly they were protected by red lead, which was considered the best coating for steel and wrought iron. The mains were coated in the same way, that is some of them. I depreciated the mains and did not depreciate the services because a service pipe can be replaced so easily, and we treat them just the same as other repair parts, but the replacement of a main is an extensive matter that affects service and is very expensive. Now, in most places, we are protecting our

new wrought iron services just the same as we do our high pressure mains. I claim that if our improved coating prolongs the life of steel or wrought iron mains, then that same coating should be applied in justice to the service pipes, or the smallest pipe, that is placed under ground. A service pipe only affects the service of one consumer—turning it off to replace it—but if you interfere with a main you interrupt the service of the whole street and you run into expense. But I think that what I have said applies, that owing to lack of knowledge mains and service pipes were not properly protected. They were protected the best we knew how at the time, but in the light of present knowledge the service pipes will be protected just the same as the mains and that would change this estimate to a certain extent, I do not know how much. There are

\$2,345,000.00 worth of services in my appraisalment and they are just as well protected and in as good condition as the millions of dollars worth of services in New York, Philadelphia, London, Paris and Berlin and other cities, the same way, the same treatment. Notwithstanding that every year we replace and abandon \$21,640.00 worth of services, I still think that no deduction whatever should be made for accrued depreciation. I believe the expenditure of this money as shown by our books has kept these up. Electrolysis very largely makes itself known and besides remedying the defect
503 we get at the cause and stop it. Electrolysis is not a very general trouble nowadays because it affects the coal pile and oil tank of the electrical man more than it destroys the pipes of the gas man.

504 Mr. N. RANDALL ELLIS, recalled for the defendants, testified with reference to depreciation as follows:

I have prepared at the request of Mr. Searls, counsel for defendants, a discussion of accrued depreciation and annual allowances for depreciation which should be allowed in obtaining the rating base and fixing the net earnings of the plaintiff, San Francisco Gas Department. This discussion and the computations used in connection therewith are included in the two statements which I now present to the court.

The first of these two statements designated as "Depreciation Study" was admitted in evidence and marked Defendants' Exhibit No. 92." The second of these statements, entitled "Detailed Computations Accompanying Depreciation Study," was admitted in evidence and marked "Defendants' Exhibit No. 93."

At the request of counsel for defendants, Mr. Ellis proceeded with his discussion of depreciation as follows:

Depreciation Study.

A discussion of depreciation usually falls under two general heads:

First. The depreciation of valuation, which is the sum to be deducted from cost whether original or reproduction as a step in determining present value or worth; and it is measured by the
505 loss in value or worth due to physical or functional causes.

Second. Accounting Depreciation. Which is the determination of an annual sum to be provided from revenue to offset the loss in worth from physical and functional causes, in order that the integrity of the investment may be maintained.

Depreciation of valuation in general results from one of two causes:

1. Physical Depreciation, covering wear and tear, and loss due to age.

2. Functional Depreciation due largely to either inadequacy or obsolescence.

Either of these is the determining factor in the probable useful life of the structure. It is obvious that on structures whose lives are limited by functional depreciation the effect of physical depreciation may be ignored; in other words the service life is the controlling element. Where the probable remaining life in service can be determined or approximated and the age of the structure is known, the probable service life is the sum of the two and in a determination of accrued depreciation, the predominant considerations are age and probable service life.

In the property under consideration the total service life of the majority of the structures is determined by functional depreciation; as to how this affects individual groups is discussed in the schedule following:

506 The structural properties may be roughly divided into the following classes according to valuation:

Mains	34. %
Paving over mains	8.5%
	<hr/>
	42.5%
Services	18. %
Holders	10.5%
Meters	7. %
Auxiliary Equip. at Plants; Boilers, Engines, Blowers, etc...	4. %
Miscellaneous Structures at Plants; Yard Mains, Piping, Oil Tanks, Wharves, Station Meters	4.5%
Generators	3.5%
Purifying Apparatus	2.5%
Street & Commercial Lighting	3. %
Buildings	2.5%
Miscellaneous Supplies, Autos, etc.....	1.5%

Mr. Bosley:

Q. Are these percentages percentages of the total valuation as made in the Jones Appraisal?

A. As made in the Jones Appraisal.

Q. And after the addition of the overhead allowances?

A. This is after the inclusion of the 10 per cent overhead in the E. C. Jones valuation. Any additional overhead would not relatively affect the percentages.

Q. You have it fixed on a percentage basis anyway?

A. Yes sir, the idea being not to determine these percentages absolutely to decimals, but to show about the relative weight of the different classes of structures in the study.

507 Q. I suppose you have determined them to the nearest tenth of one per cent?

A. To the nearest tenth of — per cent. A scrutiny of the above develops the fact that the items of mains, services, meters, and street and commercial lighting aggregate approximately 70% of the valua-

tion, and each of these groups is made up of a vast number of individual items, precluding from their inaccessibility, as in the case of mains and services, and from their number and location, as in the case of meters and street and commercial lighting, any exhaustive inspection as to condition. However, as the functional depreciation is to a large extent the limiting element on the lives of the mains, services and commercial and street lighting, their physical condition does not enter into my determination of depreciation of these items. The factors that did control the determination of useful lives are set forth in detail in the annexed schedules.

It is sometimes contended that accrued functional depreciation should not be taken into account in determining present value; I disagree with this contention and in my determination of present value have considered the two elements of age and probable useful life, whether the latter is limited by physical or functional conditions; also in computing the annual depreciation allowance I have been governed by the probable useful life thus making provision for losses due to functional depreciation. With the present property it is possible to predict from past experience and from development programs the probable useful life of many of the elements, 508 and though a structure may not have been totally deteriorated physically at the end of such useful life, I cannot see how that could influence the calculation of depreciation, except where it might involve a certain amount of scrap value or salvage.

It is certainly the useful life that is controlling with a utility having certain structures which though physically in a high percentage condition, were nearing the end of their useful life through inadequacy or obsolescence. I would not expect an intelligent purchaser to be influenced by anything more than the remaining useful life of such structures; their physical condition, presuming proper maintenance, would not interest him.

It is often argued that limiting a life through a consideration of functional depreciation is too speculative; as a matter of fact it involves no more speculation with units having a reasonable length of life than attempting to predict the so-called natural life whose limit is complete physical deterioration.

Cast iron pipe which is one of the largest individual elements in gas and water works properties may have an almost indefinite natural life under certain classes of soil condition such as the sandy soils of San Francisco, and there are records extant of cast iron pipe from 100 to 200 years old and still in good physical condition, although appraisers as a rule, do not ascribe nearly so long lives to this element.

509 I believe it may be stated that with the exception of very short lived structures, the majority of the retirement of plant units generally throughout the country is largely a result of functional depreciation. With such short lived structures such as ties in a railroad, various elements in telephone plants, etc. the tendency is toward handling them through operating accounts and ignoring them in the consideration of depreciation in any of its phases.

The trend of the Commissions throughout the country is to give full weight to the functional depreciation both in the determination of present value and in the provision for the annual depreciation allowance.

My authority is a resumé of a number of Commission decisions appearing on the subject, as incorporated in the report of the Valuation Committee of American Society of Civil Engineers, which has recently been issued, pages 1884 and following.

Probable Lives.

In the preparation for representation of the gas case before the California State Railroad Commission, independent studies had been made by both the engineers of the Pacific Gas & Electric Company and A. M. Hunt and the writer on behalf of the City, on the subject of probable lives of the various structural elements of the San Francisco gas properties; as there was not a wide divergence between the conclusions of the respective engineers on a large number of the elements, it was deemed advisable to discuss the matter jointly and attempt to arrive at probable lives which would reflect all the
510 data and experience available. With this end in view numerous conferences were held, and each item considered in detail; results were obtained agreeable to the representatives of both parties and were used by both sides in their presentation of the case before the Commission.

As a preliminary we had available the dates of installation of a large number of the structures, as set forth in Vol. IV of E. C. Jones' appraisal; from this we determined the ages of the structures. Our next step was to discuss and determine as closely as possible the remaining useful life of the structures; our probable life was then taken as the sum of the known age and the remaining life. This was the method used wherever possible; in some instances we had to deviate from it on account of lack of data, and substitute our best judgment as to probable life. The method of treatment is discussed in detail in the schedule following.

Our determination of remaining life naturally presupposed proper maintenance and operation.

The study was divided into two main groups:

1. Stations proper, or the generating plants.
2. The distribution system and miscellaneous items.

On the first group, Mr. W. C. Vincent and Mr. L. B. Jones, representing the Pacific Gas & Electric Company, and the writer, representing the city, after a careful study agreed on a tentative schedule of probable lives; this was submitted to Mr. E. C. Jones, Chief Gas Engineer, who suggested certain alterations in the schedule, which
511 were made. The schedule as finally altered was adopted by both sides and used in the Commission case.

Where a personal inspection of elements influenced purely by physical depreciation was thought to be helpful, such inspection

was made. The history and adaptability of the structure were familiar to all the engineers concerned. The conclusions reached are set forth in detail in section #1 of the appended schedule.

On the second group, namely, the distribution system, the probable useful lives were determined jointly by Mr. Vincent and the writer, after a careful consideration of all available data; as in the case of group 1, the useful life was the figure sought, whether determined by functional or physical depreciation, and as in the former group, proper maintenance and operation was presupposed. Details of the consideration given to various factors in the case of particular structures are set forth in the appended schedules.

A chart was prepared by the Company's engineers showing graphically the probable date of abandonment or supersession of a number of generating units; the writer accepted this chart as a basis on all items which it affected. A copy of this chart precedes the detailed discussion of probable life in this Exhibit.

Probable life tables as developed by Commissions and engineers in other appraisals, were not used to any extent, as will appear in the detailed discussion.

Reference has already been made to the data on ages of units at the plants proper; this information being furnished by Mr.
512 E. C. Jones. As to the average ages of items in the distribution system, such as mains, meters, services, etc., A. M. Hunt and the writer made a study of these elements and determined what was in their judgment a proper average age. There was no discussion or agreement on this subject between the respective engineers, inasmuch as the Company was not concerned with this phase of the subject, their presentation being on the basis of using reproduction new in the rating base, and setting up the annual allowance for depreciation on a straight 4% sinking fund basis.

The Master:

Q. Mr. Ellis, do you state at some place how you take care of salvage value in determining life?

A. Yes; when I come to the detailed discussion in such cases where we figured the salvage was of sufficient consequence to take into consideration, we used it by the method of estimating the absolute salvage and deducting it from the total to get what was called the wearing value; in other cases, where equipment would be transferred, by making our probable life shorter, possibly due to the loss of foundations, and moving, and so on, that however was reflected in each case and will appear I think when we discuss the individual elements.

Depreciation of Valuation.

It is the present tendency to consider that depreciation occurs more slowly during the early than during the later years of the life of a structure, and in general this is probably true. Such being the case the present value would always be greater than that shown by a

513 straight line method, and would indicate that the depreciation follows some form of a curve. In this method of treatment of the subject, the compound interest curve is generally selected, the interest rate on accumulations varying with different properties and the opinions of different appraisers.

In my calculations I have used 5% as a rate. While it is impossible to absolutely justify 5% as against 4% or 6% I believe it to be a reasonable assumption.

A 5% rate shows a higher percentage condition of the property in any year than a 4% rate, and conversely it also shows a lower percentage condition than a 6% rate.

Having determined the probable useful life, the age and the rate for the compounding, the present value is simply a matter of calculation, after which the appraiser should of course use his general judgment as to the reasonableness of the results when applied to the depreciated plant as a whole.

The result of these calculations for individual elements or groups of the appraisal are set forth in detail in the accompanying tables, in Exhibit 93.

Accounting Depreciation.

I have used that as covering the estimate of annual allowance as it is a term used by the American Society which is attempting to standardize the terminology of valuation matters.

In determining the annual sum to be provided from revenue to offset loss in value due to physical and functional causes; I have followed the method which has been called the "Compound Interest Method" by the Committee on Valuation of the American Society of Civil Engineers.

I might state that this is the same method which in their preliminary report was called the Equal Annual Payment Method and is very often known by that name. The reason for giving it this other title is to distinguish it from the sinking fund method which is also an equal annual payment method.

It is in effect determining the annuity which will amortize the remaining value of the structure in its remaining life; the interest rate assumed is 5%; this rate I believe to be equitable. The results of the calculations for the individual structures or groups are set forth in detail in tables in Exhibit 93.

As a matter of comparison I have shown in parallel columns the annual allowance and present value which would result from an application of the straight line method, and the annual allowance based on a straight 5% sinking fund method when reproduction new would be used as a rating base.

The next page is a summary of the results of my calculations: A true copy of the page here referred to, being page 9 of defendants' Exhibit No. 92, with the Master's note of reference to page 1A of Exhibit No. 93 which contains the witness' revised and corrected summary, is as follows:

515	(1) Year.	(2) Reproduction value new.	(3) Annual allowance straight 5% sinking fund.	Straight-line method.			Compound interest or equal annual payment method, 5%.		
				(4) Present value.	(5) Per cent of reproduct. value.	(6) Annual allowance.	(7) Present value.	(8) Per cent of reproduct. value.	(9) Annual allowance.
1913-14	12,127,826.11	321,274.25	8,412,629.57	69.4%	538,171.59	9,763,476.58	80.5	440,806.85
1914-15	12,407,290.41	327,166.83	8,155,938.22	65.7%	549,370.39	9,619,100.68	77.5	468,006.18
1915-16	12,803,103.90	337,088.24	7,989,548.45	62.4%	565,143.75	9,574,969.80	74.8	497,920.47

N. B.—Corrected. See page 1A in Exhibit No. 93.

516 In my final computation for the rating base and rate of return I have used the figures shown in columns 7 and 9, believing them to be reasonable and the percentage of present value as nearly in consonance with the actual facts as I could determine.

Mr. Searls:

Q. Will you indicate the principal figures that have a bearing on the case?

A. The principal figures having a bearing on the case are the reproduction value new for each of the physical years in question, column 2.

Q. That was taken from what exhibit?

A. That is developed, with all its references, in the details of the computation, Exhibit 93; in fact, this is simply a condensation of a similar summary page preceding Exhibit 93. The figures which I used in our final rating base and in our computation of the annual allowance are the figures in columns 7 and 9, which are on a compound interest or equal annual payment method. The annual allowance on a straight 5% sinking fund method and the annual allowance on the straight line method, as well as the present value developed under the straight line method, are shown more as a matter of interest to indicate the variation in results from using various methods.

On page 10 is a chart which was prepared by the Company under date of April 5, 1916, and was used as our basis in the study of the individual elements where it applied. There was a chart introduced by the Company in this case which deviated from this in
517 some respects; however, as all my depreciation tables and computations had been made prior to the introduction of this revised chart I have not altered them and I doubt if the effect would be very material.

Q. Will you state whether or not the chart you have included in your exhibit was the chart which had been adopted by the company during the years in litigation here?

A. Yes, sir. The years in litigation here are 1913-14, 1914-1915, 1915-1916; this chart was prepared as of April, 1916, and was used for my determinations.

The Master:

Q. What is the other chart, do you recall the number of the exhibit?

A. It was introduced by Mr. Jones and I believe it is exhibit 44.

Mr. Searls: What is the date of the chart which is shown in Exhibit 44?

The Master: It is dated April 5, 1916, revised January 17, 1917.

Mr. Searls:

Q. If you were dealing with probabilities during the years in litigation then, Mr. Ellis, the chart that you have included here would be the logical one to follow?

A. That was my idea. I didn't have any doubt as to the changes that were made in Exhibit 44; primarily I was influenced by the fact that all of our tables had been completed and the computations had been made and it would have been some little job to recompute them. I think however if it is thought desirable I could have computed along the same basis the effect of the alteration suggested by chart 44, if your Honor desires that that be done. I have not had the time so far to do that.

The Master: I cannot tell, Mr. Ellis, without understanding it a little more.

Mr. Searls: Your Honor will probably require the engineers to recompute the entire depreciation study, as was done in the Spring Valley case, and it might be well to wait until that time.

The Master: Yes.

Mr. Searls: You may now proceed, Mr. Ellis.

A. (Cont'g:) Page 11 starts the discussion of the individual structures. I think it might be helpful if reference is made to the appraisal as we go along. The volume and the page number will be found indicated in the left-hand column. In some cases the discussion is self-explanatory; in other cases we have referred to the remaining items in a group without specifying them in detail. If there is to be any question about that matter it should be settled as we proceed. The volume and page reference to the Jones Appraisal, which is Exhibit 3 in this case.

Probable Lives.

Section No. 1, Generating Plant.

Potrero Plant.

- | | |
|--|---|
| Vol. I,
P. 6.

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P. 8

P. 9. | <p>Berth for Vessels: This is assumed as a realty improvement and that subsequent maintenance by dredging would be handled through regular operating accounts. Consequently, the age is taken as indefinite, and there is no depreciation allowance.</p> <p>New Wharf: This wharf was installed in 1913 and is of concrete construction. The life is assumed as 20 years. This type of construction is of course far more durable than the wooden type which appears at other points in the appraisal. On the wooden plants we have used a probable life of 12 years, due to the teredo action.</p> <p>Old Wharf: Originally built in 1897, has all been replaced from time to time. Probable life, 12 years.</p> |
|--|---|

In the treatment of that item the remaining value of the wharf which is used as a walk-way was amortized over the remaining period. The probable life of 12 years, which I mention here, is of the structure itself.

P. 11. Leveling Site: This is a realty improvement and has subsequently been deducted by both the company and the City from the appraisal; age indefinite; no depreciation allowance.

P. 12. Old Generator Building: Installed in 1872. Reference to the chart attached will indicate the contemplated retirement of Jones' Sets Nos. 1 and 2, in 1918, and Nos. 3 and 4, in 1920. The building is of such character that from examination, we determined that it probably would be superseded by a building of a different type on the abandonment of the 4 sets. This gives a total probable life of 47 years.

520 P. 14. Oil Gas Generators and Equipment: Units 1 to 4. Reference to the chart indicates that units 1 and 2 will be superseded in 1918, and 3 and 4 in 1920. This indicates a probable average life for the 4 sets of 12 years. For the converted sets at the Metropolitan, and the new sets 5 and 6 at the Potrero, a probable life of 15 years has been assumed. This has been limited by a consideration of probable obsolescence. These latter sets, being the first of their type to operate under the improved process, have been given a shorter life than would first seem reasonable, as the constant development of this type of apparatus will probably obsolesce the sets before the expiration of their natural life. These lives are also predicted on the assumption that proper maintenance and repair in the matter of relining and checker-brick replacements, etc., is taken care of when necessary.

New Generator and Sterling Boiler Building.

Potrero Plant.

Vol. I,
P. 19.

This is the building in which sets Nos. 5 and 6 have been installed and in which subsequent oil sets will be placed.

521 The Brick Work and Cast Iron Columns, installed in 1885, have been given an estimated probable life of 80 years or an expiration in 1965.

The Roof Trusses, installed in 1885, will undoubtedly last throughout the life of the building; estimated life 80 years.

The Roof of the Boiler Room, installed in 1908, will probably be replaced in 1918 when there may be some changes in the building; probable life 10 years.

P. 22.

Foundations for Units 5 and 6, have been given the same probable life as the sets, that is, 15 years.

Blower Room: The Blowers and Engines were installed in 1908, and are necessary to Sets 1 to 4. If their life expired the same time as the sets, the probable life would be only 10 years. However, it was assumed that at the end of the 10 years, this equipment would have considerable salvage value and would probably be removed to other plants. In such event, of course that portion of the investment representing foundation and labor of installation, would be lost. Taking these facts into consideration, we determined a probable life of 16 years to apply to the equipment and foundation.

The Worthington Pump is in good condition, and has an assumed probable life of 20 years. The other items accessory to the original 4 sets will become worthless by 1920. They were installed on an average in 1908, which gives a probable life of 12 years.

522

P. 23.

Steam Line: Installed in 1908; will become obsolete in 1920 with the abandonment of Units 3 and 4. Probable life, 12 years.

P. 26.

Lamp Black Separators: Installed in 1906 and 1909; estimated to go out of service in 1918; resultant probable lives, 12 years and 9 years respectively.

Balance of items on which the major portion is the crane and hoist, are given a probable life of 10 years.

P. 29.

Dryer and Briquetting Machine: Assumed probable life 10 years.

Probable Lives.

Potrero Plant.

Vol. I,

P. 30.

Steam Connection to Lamp Black Separators: Will probably be abandoned in 1918 with the separator; installed in 1912; probable life 6 years.

P. 31.

Lamp Black Shed: Installed in 1872; became obsolete in 1915. Probable life 43 years.

P. 35.

Sterling Boiler Room: The boilers, with the exception of the Heine, are given a probable life of 20 years; they were installed from 1906-1908.

The Heine, a low pressure boiler, installed in 1904, is given a life of 15 years, the lesser life due to its type and probable inadequacy.

Snow pumps are assumed as having a 15 year life.

Pipe and fittings for the boilers were considered in relation to the equipment to which they applied and the calculated average probable life on this group was 14 years.

523

P. 37. Boiler House and Equipment.

Building: The steel work is assumed to have a 30 year life and the galvanized iron covering, a 15 year life; although, at the Metropolitan Plant, from an investigation and a knowledge of replacement, the corrugated iron covering is given a life of only 10 years.

Altmen Taylor Boilers are assumed as having a 20 year probable life and this is generally applied to boilers throughout the appraisal, unless special conditions modify it.

Stack: Probable life 10 years; from information furnished by the Gas Engineer it appears that from experience a shorter probable life on stacks is shown where lampblack is used for fuel, than where oil exclusively is burned.

The Master: We will take our recess now.

(A recess was here taken until 2 P. M.)

524

Afternoon Session.

N. RANDALL ELLIS.

Direct examination (resumed):

The Master: Proceed, Mr. Ellis.

P. 40. A. Emergency Steam Line: Assumed probable life, 20 years.

P. 41. Scrubbers: Installed at Intervals from 1906 to 1911. Probable life on these is assumed as 30 years. We had considerable information from Mr. E. C. Jones on the subject of these scrubbers. While a scrubber itself would ordinarily have a longer life than is indicated, they are moved from time to time, and in fact, certain scrubbers now at the Potrero Plant will probably be moved in the near future as being in the road of further development. With the moving of the scrubbers, the investment in the foundation and labor for erection is lost, and there is also entailed the cost of removing. Consequently, the figure of 30 years as applying to the complete construction is considered reasonable. This of course assumes the maintenance and replacement of any perishable parts whenever such becomes necessary.

Vol. I,
P. 41.

Q. You assume that generally throughout the consideration of Depreciation, do you?

A. Yes; in considering all the structural elements we presuppose proper maintenance and operation, which, of course, has been characteristic of the handling of these units.

525 Mr. Searls:

Q. You also presuppose the replacement of perishable parts from time to time, do you not?

A. Absolutely. That is under Maintenance. A limit of life is the expiration, either functionally or physically, of the unit; we assume that during all the life maintenance, minor replacements and repairs are made; otherwise, there would be no means of estimating the probable life. If a machine were neglected, it might terminate its life immediately thereafter.

P. 46. Brick Relief Holders: These were installed in 1872; their age to 1916 was 44 years. They are assumed to have a probable life of 50 years, or as becoming obsolete in 1922, due to their present condition.

P. 49. Exhauster Building and Equipment—Building: Steel frame, expanded metal, plaster, concrete foundation. Assumed life, 25 years. This also applies to the electric wiring. Assumed probable life on the balance of the items, 20 years, with the exception of the Root and McKenzie Exhauster, which, from its history and present condition, indicates a probable life of 30 years.

P. 52. Brick Purifying House: Installed in 1872. All the items, with the exception of the roof, are given an estimated probable life of 60 years. The tongue and groove roof covering and slate roof is given an average life of 45 years.

526

P. 54. Purifiers in Brick Building: Cast Iron: The first set of purifiers with their accessories were originally installed in 1872; the second group in 1886. These are given a probable life of 50 years, due to the type of construction.

The Sturtevant fan motor, and equipment of that character was given a probable life of 20 years, which has generally been applied to that type of equipment throughout this estimation.

P. 57. Purifiers: Built in 1891 at North Beach, and moved to Potrero in 1907. These together with the hoist were given a probable life of 50 years.

The motor and blower, a probable life of 20 years, and the oxide of iron and indefinite life, as the removal of this latter item is taken care of through maintenance.

P. 59. Jones' Wooden Purifiers: Installed in 1908. Estimated probable life, 20 years. Oxide of iron, indefinite life.

- P. 61. Oxide Shed: Wooden frame with corrugated iron covering. Estimated life, 15 years; the life of this building at somewhat less than that of other buildings of the same type, due to the rapid deterioration of the covering, resulting from the oxidizing process.
- P. 63-4-
5-6. Yard Mains, Valves and Fittings: In general, we have assumed a 40 year life in yard mains and 30 years for the valves. The Cast Iron yard mains are given a shorter life than cast iron pipe of the same diameter in the distributing system. This is due to the fact that yard mains carry with them numerous special fittings which are liable to be discarded with any rearrangement of mains, due to changes at the plant.
- 527
Vol. 1,
P. 63-4-
5-6. Oil Storage Tank: This is a steel tank on a concrete foundation. For tanks of this type of construction, we have assumed a probable life of 30 years as representing our best judgment.
- P. 68. Feed Water and Oil Heater: We have estimated an average probable life of 15 years for this class of equipment.
- P. 71. Oil Line, Tank to Pumps: A small item on which the assumed probable life is 20 years.
- P. 72. Salt Water Pump House—Building: Corrugated iron, wooden frame; probable life, 20 years, in accordance with the general assumption of buildings of this type where special conditions do not modify it.
- 528
Equipment in Pump House: This equipment was segregated as follows: The Erie Engine, steam fittings, Snow pump, and pile and timber foundation were assumed at 20 years probable life. The motor and transformers, on account of their size, 25 years. The line shaft, installed in 1910, was removed in 1916, probable life, 6 years. The belt estimated probable life, 8 years. The balance of miscellaneous items, are estimated as having an average probable life of 15 years.
- P. 75. Steam Line: Installed in 1910; estimated probable life, 20 years.
- P. 76. Outside Pump House: Wood frame, corrugated iron; estimated probable life, 20 years, as elsewhere.
- Vol. II,
P. 77. Compressor Pumps and Accessories: Estimated probable life, 20 years.
- Water Tanks: Tanks and foundation installed in 1906; abandoned in 1916. Probable life, 10 years. The Cast Iron fittings and valves have been given a probable life of 40 years; the same as in the case of yard mains.
- P. 79 Pipe and Fittings on Hydraulic Lines and Miscellaneous Accumulation of Small Pipe, to which an estimated probable life of 15 years has been given.

- P. 80. Fresh Water Lines: An estimated probable life of 20 years. In connection with these Hydraulic and Fresh Water Lines, we used our best judgment on the group, as to the function of the pipe, its size, and the possibility of removal.
- Vol. II,
P. 81. Tar Still House—Building: Wood frame, corrugated iron cover. Probable life 20 years, as used elsewhere.
- 529 Separator, tanks, etc., installed in 1906; estimated probable life, 20 years.
- P. 82. Tar Pipe: Installed in 1914; contemplated abandonment in 1918, with the probable abandonment of the Independent Station. Probable life, 4 years.
- P. 83. Blacksmith Shop: American Ingot iron covered. Probable life, 25 years. An additional life of 5 years has been allowed in this instance, due to the superior quality of the covering.
- P. 85. Machine Shop: Brick building; installed in 1897. It is estimated that the useful life of this building will expire by 1937, by which time it would probably have to be removed on account of its location. Accordingly, a probable life of 40 years has been estimated for the brick work and steel trusses and the cast iron. On the remaining elements of the building a probable life of 20 years has been assumed. These latter items were installed in 1914.
- P. 86. Office Building: The building proper was installed in 1872. It is estimated to have 20 years remaining life from 1916, making a probable life of 64 years. The telephone system, electric wiring, partitions, etc., installed in 1911, would become obsolete with the abandonment of the building in 1936, which would give an average probable life of 25 years for these latter items.
- P. 87. Office Equipment: This covers a range of items on which we determined a life of 15 years for the group as being fairly representative.
- 530
- P. 88. Laboratory Equipment: Estimated probable life, 10 years. This seems to be in accord with experience on this class of equipment.
- P. 93. Experimental Holder: Installed in 1872. This is estimated as having a probable remaining life in 1916, of 6 years. This is an old holder and in the same category as the brick relief holders spoken of before. This would give an estimated probable life of 50 years.
- P. 96. Gas Tunnel and Pipe: This will serve its function throughout the existence of the Potrero Plant; A probable life of 100 years was assumed as we did not care to ascribe to any items, a longer life than 100 years.

Vol. II,
P. 97. Meter House: The building, which is of substantial brick and steel, is assumed to have a probable life of 50 years. The meters are assumed to have a probable life of 30 years, and this assumption is made generally on station meters. The pipes, valves and fittings, are assumed to have a probable life of 40 years, being in somewhat the same category as yard mains.

P. 100. Five Million Foot Gas Holder: This is an all steel holder. After discussion and such information as we could get on the subject, our best judgment was that a 40 year probable life would be fair. This of course presupposes the proper painting of the holder at such times as it may become necessary, and which is a maintenance charge.

531

P. 102. Compressor Room and Equipment: Steel frame building; expanded metal, plaster concrete; installed in 1910. Estimated probable life, 25 years. Compressor and accessories in the building: This covers a range of different classes of equipment, on which the compressor would probably have a longer life than the average, and the engines, belts, and blowers, a shorter life, but on the whole, an average life of 25 years was assumed to be fairly representing the life of the group.

P. 108. Main Steam Line to Compressor Building: This line is well protected with magnesia asbestos covering and redwood lagging, and was assumed to have a probable life of 25 years.

P. 109. Pipe connections to Compressor Tanks: Estimated probable life, 20 years.

P. 110. Fences, etc.: Wooden fences, installed in 1892, have an estimated probable life of 30 years. The stone bulkhead is in the same category as realty, and is assumed to have an indefinite life.

Time clocks—assumed probable life, 10 years.

P. 113. Tools and Appliances: Assumed probable life, 10 years.

P. 114. Oil Storage Tank: Installed in 1890 and has about reached the end of its usefulness. Assumed probable life, 30 years.

532

Independent Station.

Vol. II,
P. 120. Wharf: Assumed probable life, 12 years. This wharf has wood piles and a wooden deck. The teredo action has been mentioned before.

P. 122. Generator Building and Water Gas Sets: In the tentative plan for development, as shown by the chart, it is assumed that the water gas sets and, in fact, the whole generating equipment at the Independent will probably be discarded in 1918. These sets were in-

stalled between 1900 and 1904. At their abandonment, in 1918, they would have an average probable life of 16 years, which has been assumed. As to the building while the character of construction would warrant a longer life, were the sets not abandoned, its type is such that it would probably have no sales value in 1918, so it has been given the same probable life as the sets, that is, 16 years.

533

In connection with this station, I will say that subsequently to the preparation of this study we have looked further into the matter of the station at the Independent, and from such information as we can get—and I have discussed this informally with Mr. Jones—it appears that two of those sets are sets transferred from the Equitable plant and that two of them are sets presumably transferred from the Pacific Gas Improvement Company's Plant, in which event this average age of the water gas sets would be altered. However, the revised chart also alters the date of abandonment of the Independent; so if I make a recomputation of those elements which are altered by the chart, I will include such information as I can get on the water gas sets.

Mr. Searls:

Q. What would be the effect of that, Mr. Ellis?

A. The effect would be lengthening the life of the water gas sets, which would mean a higher percentage condition under our method of computation and a lower annual depreciation allowance. I do not think that in the aggregate it is very material, as compared with the whole allowance for depreciation as indicated in the relative weight of the various elements of the plant, generating plants as a whole, including the Potrero, the Meteroplitan, and so on; it is only a small percentage, and this would be but a small percentage of that.

P. 122. In our study of the Independent Plant, we assumed a salvage on the generating equipment, of \$5,000.00, that is a net salvage, and have amortized the remaining value of \$106,317.00 throughout the probable life.

P. 125. Boiler House: Installed in 1902; will probably be abandoned with the plant in 1918. Probable life, 16 years.

534

Boilers: On the abandonment of the plant, the boilers would have some salvage value, and would probably be removed elsewhere. They were installed at an average date of 1903. We have assumed a 20 year probable life on these boilers. The same applies to the feed water heaters. On the small pumps we

have assumed no salvage, giving a probable life of 16 years.

- P. 127. Blower and Exhauster Room: Wood frame, corrugated iron. Installed in 1902. Probable abandonment, 1918. Probable life, 16 years.

Equipment in Building. Installed on an average in 1903. It is of a type that will warrant a transfer to other plants in 1918. Consequently, we have given the whole group a probable life of 20 years.

- P. 130. Salt Water Condensers: The foundation and retaining wall will probably be abandoned with the plant in 1918. Installed in 1902. Probable life, 16 years. The Cast Iron Condensers only adapted to water gas plants, but would have a scrap value for the Cast Iron. Consequently, we have given these items, 16 years probable life with a 15% salvage, or an estimated wearing value of \$22,157.00.

Vol. II.

- P. 131. Tar Extractors: Installed in 1905. There will be a slight salvage on these at the time of abandonment of the Independent Plant. 14 years was assumed as the probable life, after taking the salvage into consideration.

- P. 133. Pipe and Fittings: Installed in 1902. Will probably be abandoned in 1918. Probable life, 16 years.

- P. 134. Piping from Salt Water Pumps to Scrubbers: Installed in 1902. Assumed probable life, 25 years, due to salvage on pipe.

- P. 135. Equipment of Pump Room: Estimated probable life of this group, 20 years.

- P. 137. Relief Holder: The steel tank will probably be transferred elsewhere on the abandonment of the Independent Plant. Consequently, a life of 40 years has been given to this item. The excavation, foundation, and concrete, installed in 1902, will probably be abandoned with the Independent Plant in 1918. This gives a probable life of 16 years.

- P. 138. Brick Purifying House: This building, on account of its location, will remain in service even after the abandonment of the Independent Plant. Estimated probable life, 35 years.

Purifying and reviving system estimated probable life, 35 years.

- P. 140. Yard Mains: Installed in 1902. Will be abandoned in 1918. On account of the salvage value, at the time of the abandonment, an estimated probable life of 20 years has been given to this group.

- P. 141. Which is another item of yard mains, the same remarks apply as in the preceding group.

536

- P. 142. Tar Tanks: The tank itself can be removed, so it has been given a probable life of 25 years. The foundation, installed in 1902, will probably be abandoned in 1918. Probable life, 16 years.
- P. 143. Tar Separator: Installed in 1902-3. Probable abandonment in 1918; probable life, 15 years.
- P. 145. Independent Oil Tank: Will not be affected by abandonment of Independent Plant. Estimated probable life, 30 years.
- P. 146. Measuring Tanks: Installed in 1902; probable abandonment in 1918. Probable life, 16 years. These are underground steel tanks with pile foundation, and the possibility of net salvage value is Nil.
- P. 147. Oil Line: Six inch wrought iron. Installed in 1902, probable abandonment in 1918; probable life, 16 years.
- Vol. II, Oil Lines: Small wrought iron pipe. Installed in
- P. 148. 1908. Probable abandonment in 1918; probable life, 10 years.

The Master:

Q. Nothing for salvage there?

A. No, not in these small items, no salvage value.

Mr. Searls:

Q. Is there any value as scrap iron?

A. Generally with lots of small piping that has been in for a long time, the cost of taking it out, removing it and getting it in shape about offsets anything you can get out of it.

537 Q. I think you testified, in connection with the duplication of mains, that the company usually waited until the street was opened by somebody else before they took it out.

A. I believe that is true up to a certain size; I have heard estimates that if you have to cut pavement and replace it simply to remove mains that you are probably not justified in taking out mains of less than 10 or 12 inches. Is that your experience, Mr. Jones?

Mr. Jones: I should say 12 inches.

A. (Continuing:) P. 149. Fresh Water Line: Installed in 1914. These lines will have considerable salvage value on the abandonment of the Independent Plant. Estimated probable life 12 years.

P. 150. Salt Water Piping, Around Plant: Installed in 1908. Probable abandonment in 1918, with no salvage. Probable life, 10 years.

P. 151. One Million Foot Steel Holder: Installed in 1902. Will not be affected by the abandonment of the Independent Station. Probable life, 40 years, as used elsewhere on holders of this type.

P. 153. Governor House: Installed in 1902. Will go out of existence in 1918. Probable life, 16 years.

Equipment of governor house installed in 1902; estimated probable life, 16 years. No salvage value assumed on this group.

538

P. 155. Oxide of Iron: Indefinite life.

Metropolitan Station.

Vol. III. Building: The general type of buildings at the Metropolitan Plant is wood frame with corrugated iron covering. On buildings of this type, we have assumed a probable life of 20 years. An investigation of conditions at the Metropolitan indicating the necessity of renewal of corrugated iron roof covering warrants the belief that a life of 20 years for this type is none too short. It assumes, of course, the renewal of corrugated iron sheets whenever necessary.

P. 197. Tar House: Has been given a life of 25 years. The additional 5 years being due to the type of structure. There is no necessity here for a tight roof.

P. 209. Exhauster House: Steel frame, expanded metal. Estimated probable life, 30 years.

P. 160. Fence: Wood and corrugated iron. Estimated probable life, 20 years.

P. 164. Engine Room Equipment: In conformity with our estimated lives on this class of equipment at other plants, we have given this installation a probable life of 20 years.

P. 167. Wash Box and Scrubber Foundations: These are given the same probable life as the oil gas sets, namely, 15 years.

P. 169. Oil Gas Sets: The estimated probable life of these converted sets is 15 years; the same as for units 5 and 6 at Potrero, where the subject is discussed in more detail.

539

P. 172-3. Oil Tanks: Estimated probable life, 30 years, as used elsewhere on structures of this type.

P. 176. Relief Holder: Installed in 1901. Due to the light class of construction and the apparent deterioration of this holder, the probable life has been reduced to 25 years.

P. 178. Purifiers—Steel: The purifiers, pipe, fittings, and valves, have been given a life of 30 years. All other items, with the exception of oxide of iron, are given a life of 20 years, in conformity with our estimations on this type of equipment at the other plants. Oxide of iron, indefinite.

P. 180. Jones' Wooden Purifiers: Estimated probable life, 20 years, the same as at Potrero.

P. 181. Storage Holder—Steel: Estimated probable life, 40 years, as used elsewhere.

P. 183. Meters and Connections: Probable life, 30 years, the same as at Potrero.

P. 185-6-7-8-9. Yard Mains: The doors and valves are estimated at a probable life of 30 years. Pipe and fittings probable life, 40 years, the same practice as at Potrero.

Vol. III, Yard Paving: Brick, paving, estimated probable life, 25 years.

P. 190. Lamp Black Railway: The composite average life of this group was estimated at 7 years.

540

P. 192. Lamp Black Separators: Estimated probable life, after inspection, was determined as 10 years.

P. 194. Wooden Flume: Estimated probable life, 8 years.

P. 195. Miscellaneous Concrete Sumps: Estimated probable life, 25 years.

P. 196. Tar Sumps: Estimated probable life, 30 years. The additional 5 years over the preceding item being due to the more permanent character of this structure.

P. 198-9. Steel Tanks: Estimated probable life, 30 years, as used elsewhere.

P. 200. Oil Line: Estimated probable life, 30 years.

P. 202. Salt Water Mains: Estimated probable life, 15 years. Experience of the Metropolitan indicates that there is a rapid deterioration on these lines due to salt water action.

P. 205. Laboratory Equipment: Probable life 10 years, same as at Potrero.

P. 206. Tools and Appliances: Estimated probable life, 10 years the same as at Potrero.

P. 207. Boiler House Equipment: The stacks has been assumed at a probable life of 10 years, due to lamp black firing. The boilers, pumps, etc., are assumed at a probable life of 20 years for the group, as used elsewhere.

P. 209. Exhauster House Equipment: Estimated probable life of the group, 20 years.

P. 212. Auxiliary Exhauster House Has been removed.

541

P. 215. Steel Scrubbers: Estimated probable life, 30 years as used elsewhere.

North Beach Plant.

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P. 250. Fences: Installed in 1893. Estimated probable life, 25 years.

P. 251

& 253.

P. 255.

Holders: Estimated probable life, 40 years.

The Pit and Pipe: Are estimated at the same probable life as the holder, that is, 40 years. Valves and governor, 30 years.

- P. 256. Exhauster House Equipment: Estimated probable life, 20 years.
- P. 259. Boiler House: The stack is estimated at a probable life of 10 years. The balance of the equipment at a probable life of 20 years.
- P. 262. Office Building: Installed in 1893. Brick construction, estimated probable life, 60 years.

Mr. Searls:

Q. In connection with all of those items you have read, Mr. Ellis, do you take into account in every case the question as to whether or not there should be any salvage or scrap value which should be taken into account in estimating the probable life?

A. Yes, we discussed that specifically in numerous cases, as indicated here. On other types, of machinery, where a removal was possible, that was considered in reaching our final probable useful life; in other words, supposing an exhauster was set on a foundation, its useful life in its present position would be 20 years; 542 if at the end of ten years, due to changes, or to inadequacy, it were removed and transferred elsewhere where it would still serve a function, the average might be 14 or 15 years for the complete installation due to the fact that the foundation and the installation labor was lost at the end of ten years, although the machine would last 20 years. That is the way we reflect the probable life in many instances, as I have indicated here.

Q. In a large number of these items you simply stated your conclusions; I was wondering whether in each of those cases you gave that element consideration.

A. Yes, we gave it consideration generally throughout. There were many cases where we did not allow any specific salvage value or scrap value where we felt that on an average over a group the amount that might be realized from scrap and salvage would be about offset by the cost of getting it in shape to dispose of.

Q. You may continue your discussion now.

A. Probable lives, Section No. 2, distributing system and miscellaneous:

543 Studies were made on the items in this section group by Mr. Vincent and the writer and the probable lives assigned to the various structural elements were the result of our joint investigations. Prior to our conferences on these matters, independent estimates had been made both by the company and the city which were not radically different, and in view of further information obtained, the conclusions indicated in the schedule following were reached.

Low Pressure Mains.

Vol. IV,
P. 271.

The first subdivision in this classification is wrought iron pipe, on which 2" is the predominating size. We

gave the wrought iron pipe, as a class, a probable life of 15 years. This, on its face, might seem rather a short life, but a large proportion of this pipe is used for temporary mains, that is, for extensions into districts where the streets are unpaved, and street grades not finally established. Under such circumstances, the pipe may remain in for but a few years. While on its removal there is a considerable salvage element in the pipe proper, the teaming and labor element which originally entered into its installation is a loss. We examined carefully, a large number of work orders bearing on the installation and removal of 2" wrought iron pipe, and these seem to indicate that the probable life of 15 years was reasonable.

Cast Iron Pipe: This was divided into five main groups; 3"; 4"; 6" to 8" inclusive; 10" to 18" inclusive; and 20" to 30" inclusive. This division was somewhat arbitrary, but we believe it to be fairly representative of the various classes of cast iron pipe to which different probable lives should be given.

544

3" Cast Iron Pipe: This is a size which has not been installed by the company for a number of years. While there is a considerable amount still remaining in the system, a great deal has been abandoned, or has been deducted by the city under the head of "Duplication of Mains." Such pipe as remains is old, and is probably more affected by the element of inadequacy than the larger size. To the 3" cast iron pipe we assigned a probable life of 25 years.

4" Cast Iron Pipe: Estimated probable life 35 years. The 4" pipe certainly has a longer period of usefulness than the 3". While the data obtainable was not sufficient to indicate an absolute figure for probable life, we felt that an addition of 10 years over the life ascribed to 3" would be reasonable. An examination of numerous work orders showed a number of instances of abandonment or replacement of 4" pipe. In some instances, this was due to street improvements and the extension of street railway systems, where when a street was opened up for this type of improvement, it was deemed advisable to take out the existing 4" pipe, and put in a larger main. There are other instances where, due to the rapid upbuilding of certain outlying districts subsequent to the fire, the existing 4" main proved to be inadequate.

545

6" to 8" Cast Iron Pipe: Estimated probable life. 40 years. This increase over 4" represented our best judgment in the matter, as we believed that these different sizes would have a correspondingly increased life.

10" to 18" Cast Iron Pipe: Estimated probable life, 60 years. This grouping was more or less arbitrary, but pipe in this class is in a somewhat different category from the smaller sizes, as a considerable portion of it has a value as feeder pipe.

20" to 30" Cast Iron Pipe: Estimated probable life, 100 years. This includes the large interconnecting pipes between the Potrero and North Beach Plants, and the greater portion of this group will serve its present function during the existence of these plants.

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P. 273

High Pressure Mains.

Wrought Iron Pipe, 1¼" to 3" inclusive: Estimated probable life, 15 years, the same as given to low pressure pipe of a similar size.

O. D. Steel Casing, 4" to 16" inclusive: Estimated probable life on the group, 15 years. The largest individual element in this group is the 16", a high pressure main connecting the Potrero Works with the North Beach Works. This main will probably have a life of at least 20 years. The 12" main, leading from Potrero to Martin Station, was installed in 1905, and is considerably deteriorated now. On the 4" to 8" pipe, this represents several types of construction and different thicknesses of casing on some of the older lines, from data obtainable, we assumed a probable life of 10 years. With the remainder of the group, the probable life would be varied. Taking all these matters into consideration, and without attempting to differentiate between the different sizes, our conclusion was that 15 years over all, would represent a fair average.

546

The Master:

Q. These steel pipes are all covered with tar, and burlap, and so on.

A. The later ones are. There are some of the old pipes that have not that treatment. There are certain pipes that I referred to and that influenced our study on deterioration that have not the same class of protective covering as is in vogue in the more recent installation.

Vol. IV,
P. 275

Drips: Drips are given the same probable life as the pipe to which they are attached.

P. 276-277.

Valves: Estimated probable life on both groups of valves, that is, low pressure and high pressure, was 25 years.

P. 278.

Valve Pits: These are of substantial construction, and we ascribed a probable life of 50 years.

P. 279. Governor Pits Including Governors: On this group we assumed a probable life of 40 years. The pip-
547 proper would have a longer life, and the governor probably a shorter life than this average.

P. 280. Services: This is a considerable item in the appraisal. We devoted considerable time to the study of this subject, and determined on an average probable life of 15 years. Probably the governing element in determining this apparently short life is a question of inadequacy. Subsequent to the fire, there were numerous service changes made necessary due to the impetus given to gas consumption for cooking and heating, necessitating a larger service than was necessary when the gas consumption had been confined to lighting. We had available, considerable data compiled by Mr. Vincent on actual lives of gas services as determined from records of the Pacific Gas and Electric Co., and this had considerable bearing on our final conclusion.

The study of Mr. Vincent's to which I refer was a study made of a long range of services, some thousand in number, I believe, in the Oakland district, and the records were available as to the dates of installation and the dates of abandonment, and we felt they threw considerable light on the study of the services here; we used that in connection with such other information as we could glean.

Vol. IV,
P. 281-283.

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Meters and Connections: Aside from variations in size, the meters fall into two general groups, that is, tin meters, and the iron or Sprague meters. The latter group is a newer type which the company has been installing since 1912. They represent about 10% of the meter installation in the appraisal. In determining the probable life of meters as a whole, an interesting study had been made by Mr. Vincent's office along the following lines: They obtained the serial numbers of the meters which were destroyed yearly as having no further serviceable value. By communication with the manufacturers of these various types of meters, they determined the year in which the meter was built, and the assumption was that it was put in service shortly afterwards. This gave a good indication of the probable life, and while a consideration of individual meters showed a wide variation, the study of a large number, indicated a probable life of about 15 years, and this was the influencing element in our estimated probable life of 15 years. I might say in that connection that meters showed very great **ranges** of life, from a maximum of 40 down to a minimum of three to five years; but these were the weighted averages that were included in the study.

P. 284. Street Lamps, Posts and Services: This involves two elements; one the services, and the other, the cast iron posts. The lamps and appurtenances do not belong to the company; on this type of structure we estimated a probable life of 20 years.

549 Mr. Bosley:

Q. Is that correct, Mr. Ellis, that the lamps and posts do not belong to the company?

A. They belong to the Welsbach Company.

Q. You don't mean the posts, do you?

A. Oh, no. We included the lamps, the services, and the cast iron posts, which are the property of the company; the balance is the property of the Welsbach Company.

P. 285-6 Paving: This was given the same estimated probable life as the underlying pipe.

and 288. Commercial Gas Arcs: The city has excluded this group from the appraisal. The estimated probable life of 5 years which was determined by Mr. Vincent was accepted.

P. 290. In making our computations, we included depreciation allowance for the complete Jones inventory and then followed with our deductions, so that in case an item was allowed or should not be allowed, it could be followed here throughout.

Vol. IV, Tools and Appliances: Our estimated probable life P. 292- over these items as a group was 10 years.

93-96-97 Furniture and Fixtures: In general, we ascribed a probable life of 10 years to this type of equipment.

and 302. Office Building, 5th & Tehama: Wood frame, corrugated iron. Estimated probable life, 20 years, as used elsewhere.

P. 295. Meter Repair Shop: The same remarks apply as to the preceding item.

P. 299.

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P. 320. Electric Truck.

P. 307-08. Automobiles.

This type of equipment has been given an estimated probable life of 5 years.

P. 306. Garage and Repair Shop: Brick building with corrugated roof. Estimated probable life 40 years.

The Master:

Q. Would it make very much difference in your appraisal if you handled the furniture and fixtures, for instance, and the tools and appliances, on a replacement basis?

A. I don't think it would have been very material, your Honor. The reason they were included in here was due to the fact that over and above the Jones appraisal there were subsequent items which were not included in the Jones appraisal, notably the office building, and furniture and fixtures, and so on. Those were all included as part of the total capital, and as they had been included there, and a depreciation allowance set up for them, we carried the same procedure through with the furniture and fixtures at the various plants. As far as the furniture and fixtures at the various plants are concerned, it is not of enough consequence to have affected the story very much one way or the other.

Mr. Searls:

Q. How was the equipment in the central office building handled with respect to depreciation?

The Master: What I was talking about was not with respect to the office building, but the items above that.

551 A. Yes, but they were trifling; it was simply the small furniture of two or three stations, a very trifling item. Now, answering your question, Mr. Searls, a reserve was set up for the equipment in the office building; we estimated a probable life on it I think of ten years; I will come to it when I come to the second table.

Q. Now, will you take up Exhibit 93, Mr. Ellis, and see whether there is anything in that that requires explanation? State what the exhibit is and the scheme on which it was compiled?

A. The general purport of the exhibit is to apply the depreciation computations as outlined in Exhibit 92, first to the Jones appraisal and then to all other elements, such as the elements added, the city's deductions, additions and betterments, adjustments of valuation, and so on, which have entered into our final summaries of valuation for each year.

The two sheets preceding sheet 1 are an index to the contents of the exhibit.

The Master:

Q. Where is the summary sheet?

A. Sheet one is the summary sheet.

Q. I mean your detail summary sheet. What is sheet 2?

A. Sheet 2 is a summary of the valuation of depreciation allowances paralleling schedule A, Exhibit 10, and the first half of Schedule A, Exhibit 11; in other words, when we set up our valuations in the different years, Exhibits 10 to 13 inclusive, this is an attempt to parallel them as much as possible. Each table is cross-referenced

as to the source of its information. I might briefly refer to
552 the principal items.

Sheet 1 is the summation and contains similar matter to that presented in my exhibit 92, in that summary.

Sheet 2 shows the summary of the valuation as of June 30, 1914.

Sheet 3 is the sheet of computation of the additional overhead on the E. C. Jones appraisal.

Sheet 4 is the computation of depreciation allowances on items not carrying overhead. This parallels schedules C and D, Exhibit 10.

Sheet 5 shows the details of the application of additional overhead and the city's deductions.

The reason for the amount of detail in this is that to parallel this with our computations on the main inventory, we had to carry out the computations for the various adjustments and additions and betterments and so on, and we presented the whole computation in this exhibit thinking that it might be handled, if there were certain allowances or disallowances, that if a method of this sort were pursued you would have all the figures before you, rather than having to fill them out later.

Mr. Searls:

Q. In other words, you have this exhibit arranged so that if his Honor should allow or disallow any of the city's deductions the corresponding depreciation allowance appears here, which would go out or stay in with it?

A. Yes, sir.

Q. In making up your summation sheets, Mr. Ellis, you followed the city's contention with respect to deductions, did you not?

553 Q. So that the depreciation allowance on the capital items that were deducted does not appear in the sum total?

A. Not in the final summation. For instance, referring to Sheet 2, there is a summation taking care of deductions to arrive at the value as at June 30, 1914. You will understand that it starts in with the E. C. Jones valuation, less Martin station, and the adjustments to the E. C. Jones valuation which were conceded by both parties, and a deduction for the leveling of the site at the Potrero. Then follows an addition by the additional overhead according to our percentages of overhead; then follows the city's deductions with reference to where they are obtained, page 5; and then the addition of the amount to cover the exclusion of Martin Station; and then, finally, the addition of items not included in the E. C. Jones valuation, which is a matter largely connected with the main office building.

Q. By the way, Mr. Ellis, I don't think you have discussed the amortization of Martin Station. How did you handle that in your depreciation allowance?

A. We didn't make up a study of Martin Station based on the details of Martin as they appear in the appraisal, our contention being that we did not concede Martin as such, as being a proper allowance, but that we did concede an allowance of 225,000 would have been

sufficient. We have carried the 225,000 into our computations on depreciation here.

Mr. Bosley:

Q. I think you testified previously that you took that item of \$225,000 as the cost of constructing two additional generators at the Potrero which would serve the same purpose as Martin Station.

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A. Yes, that was substantially the idea.

Mr. Searls: He gave it an equivalent value.

The Master:

Q. How did you figure the depreciation?

A. We figured the expiration of this allowance of \$225,000 as at June 30, 1915; we figured a life of ten years on it, and amortized the \$225,000 on the basis of ten years. I did not carry any amortization over a period farther than June 30, 1915, under advice of counsel. I was advised that the amortization must cease with the cessation of the substituted investment.

The Master:

Q. I don't quite follow that. It seems to me you are substituting an investment as if it were new at the time you substitute it and then give it a life of ten years thereafter; is that what you are doing?

A. I assumed that Martin never was necessary; in other words, that the \$225,000 investment starting at the same time that Martin started would have sufficed throughout the life of Martin station.

Q. Still you give it a present value in 1915 of 225,000.

A. I was in error there; I carried the same allowance for Martin; the allowance for Martin was not consistent with the items of the balance of the inventory. I had forgotten that for the moment. I carried our allowance for Martin through at the same figure until it ceased, June 30, 1915. The allowance for the amortization of it was based on the straight sinking fund which would amortize the \$225,000 over the ten years.

Mr. Searls: The point is this, your Honor, that if the structure is an abnormal structure, as we contend it is, and is given a value equivalent only to that of the substitutional plant which would render like service, and has been carried by the company in the past, we assume that they have carried sufficient depreciation allowance to write off at least that value of the structure, and we are not concerned at the present time with the fact as to whether they carried more than that, or not.

Q. You may continue, Mr. Ellis.

A. The detail computations of the E. C. Jones valuation proper are covered at pages 14 to 32; the items parallel the items of the Jones valuation and set forth the ages and the probable lives as indicated in my previous study.

Mr. Bosley:

Q. On that page you have worked out the amount of the depreciation, have you, and the present value?

A. Yes, in each instance. The present value is shown for the straight line method, and also for what is called here, the 5% equal annual payment method, which is the compound interest method that I alluded to this morning.

Q. Have you employed your 5% sinking fund method in here too?

A. The 5% sinking fund method is not shown in detail on the individual sheets. It was all computed in detail for presentation before the railroad commission, and was checked by both parties as to its accuracy for 4%, 5% and 6%; in making up this exhibit, since we were not contending for a 5% sinking fund, I did not carry forward all the details; I simply showed, on pages 43 to 49, such additional computations as were necessary subsequent to the former computations, feeling that if it was deemed advisable to have
556 the details of the other computations for this method we could submit them later.

Q. You have given the values and the amounts of the annual charges on the 5% sinking fund method on pages 43 and following?

A. Covering certain additions. On page 42 you will note the statement:

"The application of the 5% Sinking Fund Method to the E. C. Jones Appraisal, as of June 30, 1914, is not shown in detail here but was worked out by the City and Company representatives together and the correctness of the calculations agreed on by them. These are shown in City's Exhibit No. 37, in the Commission Case. The rest of the necessary calculations are shown in the following pages, or on the Summary for each year, pages 2 to 12, inclusive."

Mr. Searls: I think the information you want, Mr. Bosley, is contained on page 1 in which the result of the computation is the annual allowance shown. If that allowance is used, of course reproduction value new must be used as a rating base. He has shown the reproduction value new on page 1 also.

A. (Continuing:) I have shown the essential results of using the three methods. I have not included in here all the calculations of the straight 5% sinking fund.

Mr. Bosley:

Q. On Page 1 you have the reproduction value new and the annual allowance on a 5% sinking fund basis?

A. Yes, sir.

Q. And the present value and the annual allowance on the
557 straight line method?

A. Yes, sir.

Q. And the present value and the annual allowance on the equal annual payment method?

A. Yes, sir, the idea being that with the straight line method and the equal annual payment method you use present value instead of reproduction value new.

The Master:

Q. Mr. Ellis, suppose you take the figure of \$12,127,000, in round figures, and calculate 5 per cent interest return, or return on the investment, and then give me the combined annual return for that and the depreciation allowance.

Mr. Searls: Do you mean under the equal annual payment method?

The Master: No, under the sinking fund method.

A. That would be \$927,665.

Mr. Bosley:

Q. That means that 5 per cent on the reproduction value plus the annual allowance shown here would equal the amount you have just given?

A. Yes sir.

The Master:

Q. Now take your base on the equal annual payment method, or compound interest method, and go through the same process?

A. Using 5 per cent?

Q. Yes.

A. That gives \$928,979.

Q. Practically the same as the other?

A. Yes sir.

Q. And theoretically?

A. Theoretically it ought to be the same.

Mr. Searls:

Q. That is, if you use the same rate of interest?

A. We have used it here.

558 The Master:

Q. Take 7 per cent for your rate on the investment return on those two capital sums and use the same annual allowances as before and illustrate the result there?

A. The straight sinking fund method gives \$1,170,221; the equal annual payment method gives \$1,124,349.

Q. Suppose for a further illustration you take 10 per cent of the investment return on that capital instead of 7 per cent.

A. The straight sinking fund method would give \$1,534,057; the equal annual payment method would give \$1,417,153.

Q. And what corollary or observation do you draw from these three examples?

A. I don't know that I quite follow you, your Honor.

Q. It is true as a matter of theory that the combined return both of amortization allowance and investment should be identical, the computations being exact if the rates of interest are exact?

A. Yes, and if they are not, the results are not identical.

Q. If you have a greater interest return than your sinking fund allowance the straight sinking fund method gives larger results than the equal annual payment method in the amount of the combined return of the two?

A. Yes sir.

Q. The disparity between the two methods in so far as the amount of the combined return is concerned increasing with the increase of the investment rate?

A. Yes, that is true. Using as I did a 5 per cent curve for depreciating property and considering that the amortization of the remaining value was on a 5 per cent sinking fund basis, of
559 course the use of those two is tantamount to using an equal annual payment method where the rate is 5 per cent in each case.

Primarily the equal annual payment method was devised for this purpose: In recognition of the proposition that property should depreciate and that its depreciation had probably a relation to its age and expired life there were two courses open to handle the thing consistently or to make any mathematical computation on it; one was what has been in practice the straight line, which was exceedingly simple to apply; the second was to assume that depreciation instead of going along equal increments from the beginning to the end was much less at the beginning than at the end. If you made the latter assumption and wished to have a continuous function of time you had to assume some form of curve, and presumably a sinking fund curve; the matter of the rate which a sinking fund curve should accumulate was largely a matter of choice, or judgment or opinion among engineers. 5 per cent has been favored by a number; it is pretty hard for a man to absolutely justify 5 per cent as against 4 or as against 6; as a matter of fact, it is a convenient in depreciating by such a method to use the theory that depreciation is probably a continuous function of time. As a matter of fact if we had enough information on the subject, or could, as Mr. Jones says, use an X-ray and look into matters at frequent intervals I am personally of the opinion that depreciation may be more of discontinuous function—I mean it might come in steps and jogs at times; there is no means
560 of telling. But as you are trying to arrive at some form between two limits the comparative simplicity and symmetry of a sinking fund curve has appealed to quite a number and stands high among the committee of engineers who investigated the matter from a number of sources. In other words, applying the straight line method and then looking at the results, the results often appear too drastic at an intermediate stage of the procedure.

Q. What percentage condition did you work out here on the straight line method for the plant?

A. For the plant as a whole the straight line method shows on page 9 of Exhibit 92; it shows a range from 69.4 per cent to 62.4 per cent.

Q. Between the different years?

A. Between the different years, yes sir. On the compound interest or equal annual payment method it ranges from 80.5 to 74.8. After the matter had been calculated and the results scrutinized the results obtained from the compound interest method are more in consonance with my general judgment as to the property as a whole than the result developed by the straight line method; in other words, I think the straight line method results shown here are too drastic.

Mr. Searls:

Q. Will you state whether or not, Mr. Ellis, so far as your study goes, these percentages obtained by the compound interest or equal annual payment method may be taken as a fair representation of the condition of the property as a whole?

A. As far as my judgment goes they look to me as being reasonable percentages. That is entirely a question of judgment.

561 Mr. Bosley:

Q. Have you the percentage given anywhere, Mr. Ellis, upon the straight 5 per cent sinking fund?

A. In the straight 5 per cent sinking fund you have to use reproduction new.

Q. You have not made any calculation; you have gone on the assumption that you would have the full 100 per cent value, have you?

A. You have to; in justice to the company you have to allow the full 100 per cent value. Possibly I misunderstand you, Mr. Bosley. Do you mean that a full depreciation condition would be if we assume that depreciation goes on on a 5 per cent curve?

Q. This is what I mean: If you use the straight 5 per cent sinking fund method you would have a certain part representing the present value of the plant and another certain part representing the amount of the fund held in the depreciation reserve and those two together would equal the full reproduction value.

The Master: That is theoretically so in the other two methods.

Mr. Bosley: I was wondering whether there would be the same discrepancy there that there was in the other calculations.

The Master: In the compound interest method the amount of accrued depreciation reserve taken from 100 per cent present value gives you your residual value; they are mathematical equivalents.

Mr. Bosley: I was wondering whether there was the same error when you use a different rate that would come in in the
562 equal annual payment method?

A. You understand, Mr. Bosley, that the purport of my study was not to determine something that was the equal annual payment; I was not concerned in having an equality between the an-

nual payments. We have used those percentages throughout because the tables calculated on the equal annual payment method exactly fitted my procedure, which was to depreciate the property on a 5 per cent sinking fund curve and to amortize the remaining value at its remaining life on a 5 per cent compound interest rate, which is exactly equivalent for the purposes of the calculation to the equal annual payment method where 5 per cent is used in each case. With the factors and coefficients that are developed in this table that will facilitate the computation you can take an equal annual payment 5 per cent both ways and follow out your study.

Mr. Searls:

Q. Anything further in this Exhibit 93 that requires explanation, Mr. Ellis?

A. I think the exhibit is largely self-explanatory. There is a great deal of detail here. It might be that after scrutiny by the engineers of the company there will be points that will require further elucidation or correction or adjustment. I would be very glad to confer with Mr. Vincent on the subject at any time.

Mr. Bosley: I want to defer the cross examination on this until I have an opportunity to study it a little more.

Mr. Searls:

Q. Mr. Ellis, in connection with your study of depreciation
563 I asked you to give more thought to the proposition that was advanced by the witnesses for the complainant in this case, that obsolescence is a matter to be amortized after it occurs; and that in the case of the Pacific Gas & Electric Company there has been insufficient provision for obsolescence in the past, and there remains a considerable amount of it to be amortized, and that the allowance to be made annually for the future should be based on its past accrued obsolescence; will you state, in a general way, what your views are on that subject?

A. My views on the subject as developed in this study are as follows: In the first place, the provision for depreciation, whether physical or functional, should be made, as far as possible, during the life of the existing structure. I believe that by study a reasonable determination can be made as to the probable useful life of existing structure, that being known provision can be made to amortize such structures during their probable lives. In my opinion, while it is more a question of economics, possibly, to attempt to burden the consumer say of the present day with the amortization of plants which are dead and gone hardly seems equitable to me. Of course, it is contended that consumer say at the present day has the advantage of the advances in the art and the decreased manufacturing cost of gas. I think the consumer of the present day also has his own burdens to carry, outside of carrying any of the amortization of the past; there are constant fluctuations in other elements that may be largely off-setting. Manufacturing costs, it is

564 true, have decreased for a certain period due to efficiency in methods of manufacturing; on the contrary, in the last year oil has risen so that there is a difference of 11 or 12 cents a thousand cubic feet due to the oil alone that the present consumer has to bear. Why he should have to stand the amortization of what is called the obsolescence or functional depreciation of the past I cannot see. As far as my studies have gone on this subject I cannot see but what the obsolescence of the past probably could have been provided for in the past. I believe, furthermore, that each cycle of consumers should stand on their own bottom. The consumers of the present five years or ten years are not the consumers of the past, or are not the consumers of the future. It seems a matter a little beyond my conception why consumers of the present day for instance should be interested in the amortization of property that is non-existent as far as they are concerned, it has passed out of any computations as far as capital engaged in their service is concerned, and it looks to me that just as much justice can be done to the company by making provision for the obsolescence element as well as the inadequacy element, and so on, which will reflect themselves into an estimate of useful life during the present as based on the capital useful during the present.

Q. From your study of the gas business in San Francisco would you say that the period of transition from one process of gas manufacturing to another, the period of transition from the manufacture of coal gas to water gas, and from water gas to that of oil gas, was so rapid or so unheralded as to make it impracticable to provide in advance for the amortization of the capital which is 565 peculiar to one or the other processes of manufacture?

A. Obsolescence of course never occurs over night; it can always be long anticipated. Speaking of the change from the old process of coal gas to water gas it was not a marked change from coal gas to water gas; water gas was gradually installed at plants, individual units, and it gradually supplanted coal gas until the whole thing was water gas. The disaster of 1906 came along and of course destroyed a number of the oil gas plants. Oil gas had been anticipated—undoubtedly was anticipated—a long time prior to 1906 although it had not developed to a point where it was absolutely commercially feasible. They could however anticipate that the making of either water gas or coal gas had seen its day with the upward trend of the price of coal; in other words, you can always anticipate the obsolescence, as you might call it, or even the inadequacy, sometimes ahead; it never occurs over night. Even if newer methods came into vogue they are not always substituted immediately; it is not economically feasible always. I might cite the instance of meters: As the company withdraws meters of the more antiquated type it is putting in meters of a higher type, it is putting in the Sprague meters. They would not be justified in going through their whole installation and taking out the old meters and substituting Sprague meters; they will do that as time goes on.

566 Mr. ELLIS, having been recalled by the defendants some days later, testified further, as follows:

I have a correction to make in my study of depreciation, which I presented the other day. In Defendant's Exhibit No. 93, which is entitled "Detailed Computations Accompanying Depreciation Study," an error was discovered in the method of reflecting the present value of plaintiff's properties at June 30, 1914 through the three fiscal years involved in this litigation. I have made computations to correct this error and the result is shown in the correction sheet which is to be substituted for the original page 1 of said Exhibit No. 93. This sheet is designated as "Sheet 1A Ex. 93 (Corrected)." I have not had the underlying details retyped, but will have this done and submit it later, if desired. The nature of the corrections which I desire to make and the results of which are shown in this Sheet 1A of Exhibit 93 is as follows:

The error in the method I personally did not discover until it was re-checked by the company, the computation on the depreciated conditions was carried as of June 30, 1914. When I was having the present value reflected back and forth to the preceding fiscal years, that is, 1913-14 and the two succeeding fiscal years, Mr. Henderson, who was computing the thing, carried his computations on net additions and betterments, which, of course, changed the
567 present value somewhat, particularly in this case, where changes in capital are quite material; but this computation corrects that error. I did not attempt to recompute in detail every item, rather taking them by groups. It is a very involved affair, reflecting the stuff backward and forward, because each class of claimed exclusions and abandonments has to be considered as to its probable residual life. This computation corrects the previous error. It was checked by the company's engineers, not in detail as it occurs here, but rather by a test check, and they do not quite reconcile a possible difference; in the limited time we had, we were unable to discover just where that came in; in any event, as I say, we thought if this method were to be pursued it would mean a recomputation of a great deal of the basic stuff; we did not attempt to carry it further for the purpose of percentage condition; as shown in this exhibit, it would not affect it materially, not one-tenth of one per cent.

Mr. Searls:

Q. As I understand it, Mr. Ellis, the difficulty was this, in taking the net additions and betterments for each year the company takes the cost new of the property that is abandoned and deducts it from the cost new of the property that is added, so that if you simply reflected the net additions and betterments as they stand you would, in effect, be deducting too much for the property that was
568 abandoned and has only a small residual life: Is that correct?

A. Yes. The thing works this way: The net additions and betterments are the result, really, of two computations, one gross additions and betterments, the other gross abandonments of property. As far as the reproduction value of the property is con-

cerned, of course you can take the net result of those two computations. Say we have the addition of a thousand dollars' worth of property, and we have an abandonment of \$500, the net resulting addition is \$500. However, if you take that net figure of \$500 and attempt to reflect it through present values, you will be thrown out, for the reason that the \$1,000 gross additions and betterments which have gone in are practically \$1,000 full value added to the present value or the depreciated value; the \$500 of abandonments going out are probably in the last year of life, and possibly have one-twentieth or one-fiftieth of their reproduction value; it is rather an intricate affair, and it was an error of course that they fell into just casually as it were, and it did not develop until we tested it out both ways.

Q. The effect of the annual depreciation allowance would be, to a certain extent, compensating, would it not.

A. The net aggregate of the effect of the whole affair was this, that it reduced somewhat the present value under this computation in the year 1913-14; you see, we just had the reverse process there; in the years 1914-15 and 1915-16, it increased the present value under the straight line method and the equal annual payment method; those are the only columns that were affected.

The Master: It did not affect the column on the sinking fund method with reproduction value new?

A. No, not at all.

Mr. Searls:

Q. How did it affect the depreciation fund.

A. I would have to give you the comparison. There were a couple of intermediate errors, that is small, clerical errors, rectified at the same time.

Q. I do not mean, necessarily, the exact figures that would be shown by the exhibit, but it would decrease——

A. (Intg.) The maximum effect of the whole error would be shown in the value as of June 30, 1916; I mean that is where it reaches its culmination, as far as error is concerned. In the previous computation, under equal annual payment, the present value was shown as \$9,596,000; on the recomputation it is \$9,885,000; the annual allowance in the previous computation was \$514,000 and in this computation it is \$525,000.

The Master: On the original sheet 1 of this exhibit you did not carry your percentage condition?

A. No.

Q. That was shown somewhere there?

A. It was shown in a previous exhibit.

Mr. Bosley: I think it was shown in 92.

A. In 92, the last sheet; I overlooked the correction on that sheet.

570 Mr. Searls: You had better have a correcting page made out so that it can be substituted.

A. Yes; the correcting page is practically a transcript of this with the percentages included.

Mr. Searls: I ask that this page be inserted at the proper place in Exhibit 93, and the page already there be marked as void.

The Master: I will simply put on it, "Corrected for error in computation, see next page," and I will number this page 1a.

Mr. Searls: I think possibly the original sheet in Exhibit 92 that Mr. Ellis has just referred to had better be marked "erroneous," so that there will be no confusion when you come to go over it. What was it, page 9, Mr. Ellis.

A. Page 9.

The Master: I will mark that "erroneous" and make a reference to this other page. "Corrected, see page 1-a, Exhibit 93."

A. It is of interest, in passing, to note, after these changes, the percentage condition. The percentage of present value to reproduction value as shown in the previous exhibit on the equal annual payment or modified sinking fund method was in 1913-14 80.5%; under this computation 80%; 1914-15, previously 77.5%; on the recomputation, 77.9%; 1915-16, previously 74.8%, and on recomputation 76.2.

A true copy of said sheet 1A, Ex. 93, as corrected, is as follows:

571 Table Showing Total Value of Non-landed Property for End of Each Fiscal Year and Average for the Fiscal Year; also the Annual Allowance for Depreciation for the Same Periods.

(Exclusive of Working Capital.)

Sheet 1A, Ex. 93 (Corrected).

Year.	5% Sinking-fund method.		Straight-line method.		5% equal annual pay method.	
	Reproduction value new.	Annual allowance.	Present value.	Annual allowance.	Present value.	Annual allowance.
6/30/13	12,008,722.09	318,502.70	8,445,898.80	532,915.33	9,716,996.02	434,119.56
6/30/14	12,246,930.14	324,771.13	8,292,111.48	543,887.69	9,684,327.33	454,536.19
Average, 1913-14 . . .	12,127,826.11	321,636.92	8,369,005.14	538,401.51	9,700,661.67	444,327.87
6/30/15	12,567,650.66	327,824.06	8,131,846.15	553,187.80	9,627,326.75	483,142.23
Average, 1914-15 . . .	12,407,290.40	326,297.59	8,211,978.81	548,012.74	9,655,827.04	468,839.21
6/30/16	13,038,557.17	338,578.53	8,253,748.51	572,800.33	9,885,679.67	525,727.80
Average, 1915-16 . . .	12,803,103.92	333,201.29	8,192,797.33	562,969.07	9,756,503.36	504,435.01

Percentage of "Present Value" to "Reproduction Value."

	Straight line.	Equal annual pay.
1913-14	69.0%	80.0%
1914-15	66.2%	77.9%
1915-16	64.0%	76.2%

572 From the data and detailed computations contained in said Exhibit No. 93 and summarized on said sheet 1-a it appears that Mr. Ellis' estimates of the reproduction value and the present value of plaintiff's Independent Plant (exclusive of oil tanks and a gas holder having a capacity of 1,000,000 cubic feet) and of the four old Jones oil gas generators at the Potrero Station and his estimates of the proper annual allowances for depreciation of these properties and a substitute for Martin Station, are as shown in the following table:

	Reproduction value.	1913-14.		1914-15.		1915-16.	
		Av. present value.	An. deprecia- tion allow.	Av. present value.	An. deprecia- tion allow.	Av. present value.	An. deprecia- tion allow.
Independent Plant, excl. oil tank & gas holder. \$399,034.00		\$229,612.00	\$20,241.00	\$209,350.00	\$21,283.00	\$188,077.00	\$22,297.00
Potrero 4 old Jones sets. 234,951.00		124,079.00	20,171.00	103,795.00	21,184.00	83,080.00	22,352.00
Substitute for Martin Station	225,000.00	225,000.00	17,889.00	225,000.00	17,889.00	.....	.....
Totals	\$858,985.00	\$578,691.00	\$58,301.00	\$538,125.00	\$60,356.00	\$271,057.00	\$44,649.00

Cross-examination (resumed).

Mr. Bosley :

Q. Mr. Ellis, on your direct examination you considered the general subject of obsolescence. Will you please tell me what you understand to be the proper meaning of the term "obsolescence" as used with reference to property such as constitutes the gas manufacturing and distribution system of the plaintiff in this case?

A. Obsolescence, as ordinarily interpreted, is one element in functional depreciation; that is, briefly, obsolescence is a loss in value due to change in an art; specifically, in a gas case, obsolescence in machinery would come through the fact that the method of manufacture had been improved and apparatus that might have physically sufficed for continued operation would be uneconomical under new discoveries or patents.

Q. Well, now, as I understand your position, then, you consider that obsolescence arises as the result of some advancement or progress in the art and science with reference to the particular industry.

A. Yes.

Q. To what do you consider that advancement in the art and science is due?

A. It is due to experience and study on the part of engineers or those directly interested in the subject.

Q. In many cases, the advancement in art and science is
574 due to a thing that may be simply called invention may it not?

A. Yes.

Q. If it rises to the rank of invention, then you have something that is patentable, of course?

A. Yes.

Q. If it is mere improvement, that is of a lower nature, that is something that does not call for the exercise of inventive talent, it is classed as one of the ordinary advancements or progress in the arts and science, is it not?

A. An ordinary development.

Q. That it may be patentable, the improvement must have in it the element of invention, that is, there must be a discovery of something new?

A. There must be some radical change which was not an ordinary, progressive development.

Q. Of course, you know, as the court knows, that when the progress is due to a real invention, the invention is patentable?

A. Yes.

Q. And the effect of the granting of a patent is to give an exclusive right to the patentee for the use of his invention during a limited period of time?

A. Of course, I might say there is one other element that might affect obsolescence, that is outside of the sphere of invention, and

that is particularly demonstrated in the gas industry here, the coming into the field of a large quantity of comparatively cheap fuel such as oil. I mean that gave the incentive for the change that would meet that physical condition.

575 Q. Yes, the discovery of oil and its production in large quantities, so that it was placed in the market at a reasonable price was concurrent, practically, with an increased cost in obtaining coal, was it not?

A. Yes.

Q. In that case, is there any real obsolescence? That is, does a change in the method of manufacture of gas, for instance, from the use of coal as a fuel to oil as a fuel, necessarily involve any obsolescence in the ordinary sense of the term?

A. Yes, I think it does.

Q. I think you heard the testimony of Mr. Lowe to the effect that water gas apparatus is not obsolete, that it is modern, that it is in general use in other parts of this country and elsewhere in the world, and also to the same effect with reference to apparatus used for the manufacture of coal gas; that apparatus and the processes used for the manufacture of coal gas and water gas are not obsolete in the sense that they have been superseded by something new or better in the same direction?

A. That is correct.

Q. But that a change from coal as a material to oil as a material for the production of gas has been brought about by natural and industrial conditions?

A. Yes.

Q. In that case assume that the oil gas process and apparatus have been invented so that they, as well as the coal gas process and apparatus and water gas apparatus and process, were all well-known and were all adapted for use wherever the right kind of fuel
576 could be obtained, a change from water gas or coal gas to oil gas due to a change in the fuel conditions would not really represent any advancement in the science or art, would it?

A. No.

Q. The change there is an economic one?

A. Yes.

Q. It is due to a change in trade or industries—I had better say that it is an economic change or industrial change rather than a change due to the progress of the science or the art?

A. Yes, and it is for that reason, precisely, I always hesitated about attempting to discuss obsolescence per se as it were. It strikes me that there is a larger group of the same class of deterioration under what is generally termed functional depreciation. It may possibly be obsolescence, it may be inadequacy. In other words, it looks to me as though the question of loss in value of property falls generally into two large classes, one due absolutely to physical deterioration, the other to a combination of various causes, some of which might be termed in the valuation "obsolescence," and some possibly "inadequacy," supersession, on account of position.

Q. As I understand it, you would not consider the term "obsolescence" properly applicable to a mere change in economic conditions which would result in making it advantageous to substitute one form of fuel for another?

A. No, I think that would fall in the same general category
577 as functional depreciation, as differentiated from physical depreciation.

Q. Of course, it might happen, as apparently it happened, from the testimony in this case, that at the same time that coal was becoming scarce and more difficult to obtain and oil was becoming more potential and cheaper, an invention was made that enabled the public utility to make use of the oil advantageously in the manufacture of gas.

A. Yes; the invention of that character, of course, naturally followed the economic demand; there was an incentive for it.

Q. Now that the oil gas process has been invented and carried to a high degree of perfection, without the aid of any invention whatever changed fuel conditions might result in a change from the manufacture of coal gas to the manufacture of oil gas, or to the manufacture of water gas, might it not, in different sections of the country?

A. Yes; in other words, your basic product, of course, will influence your type of apparatus that you will use to convert that to gas.

Q. Now, let us take the case of obsolescence proper, where a new process is invented or new apparatus is invented for use in any particular industry. What are the underlying causes that induce the owners of manufacturing plants, we will say a gas-manufacturing plant, to avail himself of the new invention, whether it be of apparatus or of processes.

A. Ultimate economy considered both from operation and the further consideration as to whether the existing apparatus
578 will warrant abandonment and that abandonment be covered by the economy of the improved type.

Q. Is it not true that the advantage embodied in the new invention that will induce the owner of an existing plant to change his plant to one of a different type will generally either take the form of a diminished cost of production or of an improvement of some form in the service, so as to make the product of greater value to the consumer?

A. Yes, or a combination of the two.

Q. You might have a combination of the two?

A. Yes.

Q. But the advantages will be along the line either of diminishing the cost of production per unit of product or of improving the quality of the product, whether that product be some physical object or a service?

A. Yes

Q. If the improvement tends to improve the quality of the product, that is of the thing produced, or the service rendered, that

makes something that is more valuable to the consumer, to the user, does it not?

A. Yes.

Q. And you would expect, then, that the reward to the person who adopted this improvement would take the shape of an increased compensation for the product or service, would you not?

A. Yes.

A. To some extent.

Q. That would be natural to expect, would it not?

A. I don't know that I exactly interpret your question. Personally, I do not think that all of the benefits of a new improvement should inure to a corporation. I rather think that it is
579 a mutual affair; the corporation and the consumer should share in it. That is a question, rather, of equities than of engineering.

Q. If you eliminate the question of regulation by public authority, if you are to deal now with simply an industry that is on a competitive basis, and if there were several producers supplying the same market, and one of them found that by availing himself of a new invention he could manufacture a better product, one better adapted to the requirements of the consumers, the cost being the same, we will say, for the purposes of the question, the only inducement that that particular individual would have to obtain the patent and to produce this improved product would be the hope of getting a larger, probably somewhat larger price.

A. Yes.

Q. From the consumers, or possibly by so extending his sales that his net profit from his entire business would be increased. It is not always true that the cost of putting out a product increases in proportion to the number of units producing it?

A. No.

Q. That is, there are in almost every industry some fixed charges that will probably not vary, but there are others that are variable.

A. Variable with the output.

Q. It may be that the individual who has a new industry and who has the right to place it on the market may so extend
580 his market that he will obtain a larger net profit?

A. Yes.

Q. Suppose the other case, where the new invention does not result in increasing the value of the product, does not make the product any better, does not make the service any better, but simply results in diminishing the cost of production, the product or the service remaining the same; the inducement there to the owner to put in the new apparatus, to adopt the new process, is the greater saving, that is, greater net profit than he will get in furnishing the same old product at the same price?

A. Yes.

Q. That also puts him in the position of advantage in dealing with his consumers, does it not, as compared with his competitors?

A. Yes.

Q. If he can manufacture more cheaply than his competitor, he may, for the purpose of extending his business, reduce his rates, somewhat undersell his competitors?

A. Yes.

Q. And then extend his business and make larger net profits. Now, the operation of the law of supply and demand tends to give the consumer a part of the benefit, does it not, of the diminished cost of the production? That would be the tendency?

A. That would be the tendency of the operation of the law of supply and demand.

Q. Well, now, suppose we take the case of the individual who has a particular gas manufacturing plant and distribution
581 system in a particular community, and he already has a plant that is adequate to meet the demands of the public in that particular place, and someone comes to him and tells him that he has invented new apparatus, or a new process by which an equally good quality of gas can be produced at a very considerable reduction in cost; the owner of the plant, on investigating the new invention, becomes convinced that the inventor's claims are substantially sound, and he desires now to avail himself of this new invention. Will the quantity of the saving and its relation to the magnitude of the business be likely to influence him at all in determining whether or not he will purchase the rights to use the patent and put the invention to use at once?

A. It would; that would be the governing feature.

Q. Suppose, for instance, we find that he has a plant already in operation that represents an investment, we will say, of \$100,000, and he finds that in order to avail himself of this new process he must erect new apparatus at a cost, we will say, of \$100,000, and to gain the full benefit of it he will have to abandon his old plant that cost \$100,000. With that sort of a problem, what process would the owner go through in his mind in order to determine whether or not he would invest that additional \$100,000?

A. Well, he would naturally consider whether the resultant operation economies warranted the abandonment of whatever
582 residual value he had in his property that he considered retiring.

Q. Let us consider that his whole plant had only been erected, we will say, for one, two, or three years, a plant of a long-expected life, that he had just succeeded in bringing his existing plant up to its highest state of perfection, he had had the opportunity of replacing parts that proved to be structurally weak or defective with better parts, and he had actually gotten his plant now at the highest state of efficiency, and where his cost of maintenance and repairs and replacements was at the minimum, so that he has an existing plant that is as nearly 100% of reproduction cost as it is possible to have any plant in operation. Now, in order to induce him to make a change, there would have to be good reason to believe that the succeeding system would be more economical in operation, would there not?

A. Yes.

Q. Suppose his cost of production in this case, where he has this \$100,000 plant in perfect operating condition and where he knows he ought to avail himself of the new invention, he must invest another \$100,000 in putting up the new apparatus as the result of his abandonment of the old, suppose his cost of operation per year is \$100,000, and suppose that the new invention will result in a saving of 5% per year on his cost of operation, that would make it result in the operation of a saving of \$5,000 a year, would you think that would be sufficient to justify the owner in making the change?

A. It is pretty hard to answer that specifically.

Q. Let us assume, now, that the expected life of both plants was 20 years.

A. It is difficult to give an absolute judgment on that; 5% in operating expenses saving might justify him——

Q. I might say now that his operating expenses with the old plant would run on an average \$100,000 a year. How long would it take him to save out of his cost of operation the value of his existing plant?

A. Of course, on that basis, if that were the only element to consider, saving, as you say, 5% a year, in 20 years, without any compounding of interest or anything of that kind, you would make the cost of the old plant, but I think that is only one element that would enter into a computation of that kind; in other words, the test that I think you should apply is sometimes known as the unit cost of operation depreciation theory propounded by H. P. Gillette, on which you consider all the operative conditions of an existing plant, the economies in operating a substitute plant, possible residual life of the existing plant as compared with the substitute plant, a rather complex affair.

Q. Let us keep our problem simple. The net result of the construction and operation of the substitute plant using the new invention would simply be a saving of \$5,000 a year for the period of 20 years, that is the expected life of the old plant; would the owner see any advantage in making the change under those conditions?

A. Well, it would probably be a stand-off, I mean looking at things just casually, without the details of computation.

Q. If you look at it from another point of view and consider the fact that in one case he could continue without asking any more capital and would be just as well off at the end of the 20 years, he probably would not make the charge, would he?

A. Probably not.

Q. And to make the change involves hazarding an additional amount of capital?

A. Yes.

Q. There would have to be some advantage, something more than equality of advantages and disadvantages to induce the change, wouldn't there?

A. Assuredly.

Q. Now, is it not perfectly true that in a case of that kind that the owner would consider that a part of the cost in adopting the new process would be the abandonment of his existing plant?

A. You mean as an influence affecting him as to whether he would accept it?

Q. Yes.

A. Yes, you take into consideration the abandonment of the existing property.

Q. Now, in our hypothetical case the product is the same in both cases. Does that make any difference to the consumer whether the owner of the plant continues his old plant in operation or puts in the new one?

A. I do not see that the consumer is particularly concerned,
585 outside of the price that he pays.

Q. In order to break even, the owner would have to continue to charge the same rate, would he not, in the hypothetical case?

A. Yes.

Q. The consumer would have no advantage?

A. No.

Q. It would be utterly a matter of indifference whether the owner continued to manufacture with the old apparatus or used the old process or installed the new one?

A. Yes.

Q. Now, if you adopted the ordinary method of providing for depreciation, reserve for the ultimate replacement of the plant would have to be made in either case, would it not?

A. Yes.

Q. If he retained his old plant, he would provide replacement reserves that would enable him to amortize it during a period of twenty years?

A. Yes.

Q. Now, if the owner had put in your new plant, he would have to amortize that new plant in the same period, wouldn't he?

A. Yes.

Q. And then he would have to use this saving effect in his operations to amortize the old plant in order to enable him to come out even?

A. Yes.

Q. If we increase that advantage, however, of economies in the use of the two apparatuses, then there comes to be a margin of advantage for the owner, doesn't there, assuming the prices
586 all remain the same?

A. Yes.

Q. And if you increase them still further it may be that the owner will find that by manufacturing more cheaply he can afford to lower his rates and extend his market and realize a larger net profit?

A. Yes.

Q. When he reaches that stage there is an advantage both to the owner and to his consumers in making the change?

A. Yes.

Q. Now, let us assume a competitive condition: Let us assume that there are two gas companies operating in the same territory, both having new and thoroughly efficient plants that have been brought to their highest state of perfection, neither one of which, however, has been in use long enough to have any real depreciation accrued, and when they are both in that state somebody invents a new process, a new apparatus; he offers it for sale to each of those two companies, saying that he will supply it to one, and of course he cannot sell exclusive territorial rights to both—he has the right to sell it to either one—now suppose we have this same hypothetical case, where the saving in operating is just sufficient to provide for the amortization of the reproduction cost of the plant, and suppose one of these parties purchases the territorial right under that patent and decides not to construct a new plant, would you say that his property had depreciated through obsolescence?

A. I don't know that I quite follow you. You say he has
587 purchased the patent rights and does not put them into use?

Q. Yes.

A. No. If the patent rights have not been used, I would not say that his property has depreciated through obsolescence.

Q. Suppose, however, neither one of those two existing gas companies purchases the patent, and suppose the inventor succeeds in interesting some man possessed of ample capital in his new process, and the result is that a new company is organized and is about to enter the field as a competitor, will the new company put up a plant on the old design or will it probably avail itself of the newer design, the newer apparatus that is more economical in operation?

A. Probably the newer design, undoubtedly.

Q. In that case, the new company would be in a favorable condition for competing with the old, would it not?

A. Yes.

Q. It could install a plant on the same capital investment of \$100,000, but it could operate \$5,000 a year less than either of the old ones; in that case it would reduce its rates somewhat and probably seriously invade the business of the two old companies, couldn't it?

A. Yes.

Q. In that case, would you say there was any obsolescence in the case of the old plants?

A. Yes, certainly; in the first question, I understood this was a tentative invention that had not been proved out.

Q. No, I am taking one of these cases where the invention has been tested and tried out and shown to have been practicable.

588 A. And proved to be economical?

Q. And proved to be economical.

A. I will alter my first answer, then.

Q. In the first supposition, one of the existing companies purchases these patents, but not seeing any advantage to itself in substituting the new patent at once simply decides to retain possession of the territorial rights under that patent and to continue to use its old apparatus.

A. If you will permit me to answer this in my own way and speak of it specifically, someone that comes into the field with a demonstrated improvement in gas making in San Francisco, which had been demonstrated to be a big economy, and some company had not availed itself of that and still maintained the old method of gas manufacturing, a parallel between the improved economic demonstrated innovation and the old method would reflect obsolescence in the old method.

The Master:

Q. Assuming that the new plant was built?

A. Absolutely, or even assuming that it was absolutely demonstrated. Here suppose an instance specifically as to oil gas: Suppose Mr. Jones and Mr. Lowe had determined the output of oil, and what oil gas could be manufactured for, and what amount of equipment was necessary to manufacture it, and what the cost would be, and then they presented it to the San Francisco Gas & Electric Company, and the San Francisco Gas & Electric Company said "No, that is all demonstrated, but we are going to hold onto our old plants, even though it is now demonstrated that that method has stood the test of engineering study," the San Francisco Gas & Electric Company plants are obsolescent to a certain extent, undoubtedly.

589 That you might say of any improvement in any type of electric motor; if you demonstrate on the market that here is a new motor, that is far more economical, it will only be a question of a short time before he gets hold of some business man who will take that up, and the old type is to that extent obsolescent.

Mr. Bosley:

Q. Suppose now we have the case where the municipality itself desires to construct and operate a plant for the manufacture and distribution of gas, and proposes either to purchase the existing plant or to enter into competition with the existing plant. Now we will assume that this new invention is covered by a patent that has, we will say, fifteen years of life to live; and suppose the company in the field that is already serving the territory has acquired the patent rights for that territory. If the municipality desires to establish a competitive plant, what sort of plant must it establish, the newer one or the older one?

A. Presuming that the existing company has control of the improved patents?

Q. Yes, for that territory.

A. The municipality I should think would not attempt to enter into a competitive field unless it had something equally as good as the company.

Q. Let us assume that it proposes to enter into the field anyway; it desires to have its own plant, whether for political or other reasons; and the only kind of a plant that it can erect would be one of the type which was available to everybody to erect, would it not?

A. I presume so.

Q. That is, it would not be able to construct a plant——

590 A. (Intg.) It would not be able to infringe on the patents in building a plant.

Q. In accordance with the latest invention, if the company already occupying that territory had acquired the patents rights for that territory?

A. I presume it could not infringe on anybody's patent rights.

Q. That is the only thing that would be available to the city, unless it wanted to await the expiration of the patent, to construct a plant along existing lines?

A. Yes.

Q. It could not serve itself and its inhabitants any more cheaply than the old company with its existing plant?

A. Nor as cheaply probably.

Q. We are assuming the old company has not put its invention into use. Now if the municipality instead of starting a competitive plant desired to purchase the plant of the company that was already in the field and the company already in the field offered to sell its existing plant as it is at the full reproduction cost less any physical depreciation that might have occurred, would the city find it to its advantage to refrain from purchasing and erecting another plant of the same kind?

A. You mean if they had a chance of buying a plant of one kind as against erecting a plant of a similar type?

Q. Yes.

A. It would be an even break, outside of what little advantage might be offered in the bargain.

Q. Do you think under those circumstances that the existing company, one that was already serving the territory would sell its existing plant at a price below the reproduction cost, assuming now
591 that it was a plant that was new,—it had suffered no physical depreciation; simply because of the fact as compared with the invention, there was some obsolescence there?

A. Possibly they would. I don't think that would be one of the controlling features, if I understand the question.

Q. Suppose we say now the company is already there and has a plant in such condition that it is new to all intents and purposes; it has been brought to its highest state of efficiency and the material has been placed in such condition that there has been no physical depreciation, in fact the plant has been thoroughly tuned up and brought to highest physical condition, and suppose now the municipality desires to engage in this business itself and enters into negotiations for the purchase of the existing plant, and during the negotiations says to the existing company, it is true that the reproduction cost of the plant is \$100,000, but there is a new invention here that has resulted in some obsolescence in your plant, and we now offer you not the full reproduction value of your existing plant, but your reproduction value less an amount which represents the amount of the accrued depreciation due to obsolescence.

Mr. Searls: What assumption do you make with reference to depreciation reserve. Has anything been carried in the past, or not?

Mr. Bosley: No;; we will assume this is before any has been started at all.

A. And the question is would the municipality be willing to pay a reproduction cost?

592 Q. I want to know just what would be the position of the owner when the municipality made that kind of an offer to him?

A. Is the owner selling the plant and also his acquired patents?

Q. No, he is only negotiating for the purchase of the plant?

A. I don't know what the owner would do under those circumstances.

Q. Would the territorial rights under the patent for that particular municipality be of any value to the existing gas company unless it also owned and could operate the gas plant?

A. I presume not.

Q. Unless it could sell it to somebody else to operate in the same territory?

A. I presume so.

Q. The owner of the plant would be in the position where it would have the existing plant and where it would have the territorial rights under the patent for that particular municipality?

A. Yes.

Q. The rights under the patent put the company in a position where it might avail itself of this new process, the new apparatus if it chooses, but if it is to sell out and not to re-engage in business in that community, the territorial rights under the patent would be of no value to it apart from its ownership of the plant, would it?

A. Probably not.

Q. Would not its position then be that it would sell the plant together with the rights under that patent for nothing less than the full reproduction cost of the plant?

A. I don't know what a company would do, or what a municipality would do under those hypothetical conditions.

593 Q. We will assume that no pressure is being brought to bear?

A. I am unable to put myself in the position of what the plant owner would do or what the municipality would do under all those hypothetical conditions. I mean I am not a dealer in gas plants, so I don't know just what they would do. There are always very many elements that are of influence in negotiations between a gas company and a municipality. I know, Mr. Bosley, that this is my theory of the matter: If I were asked to advise a company or a municipality which was going on legitimately—I mean presuming everything else was out of the way—and it was going to consider the acquisition of a gas plant, and if that gas plant held the control of some new patents that had not been put into effect, I would not advise my client, the municipality, to pay any reproduction value for this existing gas plant even though they wanted to buy it,—I

mean as a pure, cold-blooded proposition, that there is depreciation here and there, there are parts that are more or less obsolescent; that is as far as I can give you any light upon the subject.

Q. Would you expect a municipality to be able to purchase an existing plant and the rights under the patent for anything less than the full reproduction cost of the existing plant?

A. I don't know. I would advise them, as I said, if they were buying the plant, to buy the type of plant with the most improved process that was known to exist.

The Master:

Q. If there was a patent involved, you would advise them to
594 buy the rights of the patent?

A. I would tell them to buy that also.

— Have you capitalized your patent rights in this case?

Mr. Bosley: What do you mean by capitalized,—appraisement?

The Master: In your appraisement.

Mr. Bosley: We have introduced evidence which I think establishes a proper basis for making an estimate of the value of the patent rights, but we have not had any witness make the inference and testify what in his judgment the patent rights were worth.

Mr. Searls: I think the amount you paid for them is in evidence, is it not?

Mr. Bosley: Yes, that is in evidence.

Q. At the expiration of the limited period for which the right of the inventor is protected by the patent laws the new invention is available to everybody of course?

A. I presume so.

Q. And everybody can avail themselves of them without the payment of any royalties, or without the necessity of dealing with the inventor?

A. Yes.

Q. But prior to that time the owner of the patent has property there that represents control of the use of that invention until the expiration of the limited period for which the patent is granted?

A. I assume so.

Q. I think your answers so far have illustrated the fact that obsolescence may be viewed from different points of view. The fact that there is a new invention which enables a company at
595 the present time to erect a plant that can be operated more economically will be a controlling factor with anybody who is about to start into the business and who is going to erect a new plant; even a comparatively small advantage in that case will be sufficient to induce the prospective builder of the plant to adopt the new rather than adopt the old; that is true, is it not?

A. Yes.

Q. But if the owner of the existing plant obtains the rights under the patent so that he is not subject to the danger of competition from somebody who might acquire the patent rights covering that par-

ticular territory, the question of the substitution of a new plant for the old becomes one of comparative advantage to the owner, does it not?

A. Yes.

Q. And I apprehend that there is no public authority that could compel the owner of an existing plant to abandon that plant and substitute a new one simply in order to diminish the cost of production and furnish the product at a correspondingly diminished price to the consumer?

A. I don't know.

Mr. Searls: Do you think Mr. Ellis is an authority on public authority?

Mr. Bosley: I am just making this statement. I apprehend there is no authority to compel him to do that thing.

Q. In the absence of any authority to compel the owner of the plant to install new apparatus and turn out the product at the diminished cost the thing that will control the action of the owner is the comparative gain or advantage from the substitution of the new process, that is a gain following from two courses, one from
596 following the old and continuing to operate that with somewhat less economy and the other the making of the new investment and availing himself of the economies resulting from the use of the new invention?

A. Or, I think, if I may supplement that, Mr. Bosley, with what is always done, I think the combination of the two, the gradual introduction of the new process as the older one is being retired, no radical over-night sweep from one to the other; but as the old elements wear out there is a gradual installing of the new one.

Q. You again bring in the case where one is somewhat more advantageous than the other but not sufficiently more advantageous to justify a complete immediate substitution; and where the new is more advantageous to the point where it justifies making all new construction in accordance with the new method rather than the old?

A. What I was referring to is this, that new elements would be substituted as the older ones dropped out. In other words, in any plant there are always elements of the plant in different stages of condition. Speaking specifically, take for instance the Independent plant, the water gas process was in operation until the last couple of years, although the oil gas had come in in 1905; it was not economical to cut out the Independent water gas process until there had been developments in the Jones sets for a couple of years; ultimately they found it was worth while to drop out the Independent set when they had put in the new two Jones sets.

Q. Let us revert to the hypothetical case of having our
597 plant represent an investment of \$100,000, and let us assume that our operating cost is \$100,000, and that the erection of a new substitute plant would involve an investment of \$100,000. Let us now assume that the saving in operating cost that would result from the substitution would be \$50,000 a year. In that case do

you think the owner would wait until the existing plant was in a condition where he wanted to replace it, or would he wait until he had to put in a new unit, or do you think he would proceed very promptly to substitute the new plant?

A. Under any such drastic assumption of course, a 50 per cent change in operating conditions, involving 50 per cent of all of his capital, of course he would change.

Q. In other words, he could write off the entire loss due to the abandonment of the old plant out of the savings effected by the new process?

A. Assuredly.

Q. And from that time on if the rates remained the same he would find his net profit increased by \$50,000 a year?

A. Yes.

Q. In the case of a plant that has 20 years life the advantage would be in making the change as soon as you possibly could?

A. Yes.

Q. But there may be all degrees of relative advantage in the two processes?

A. Yes.

Q. It might be that the advantage in the new is so slight that it is not worth while for the owner to substitute a new plant
598 for the old one, but merely to avail himself of the new invention whenever he has to construct some new additional units?

A. Yes.

Q. To make an addition to his plant?

A. Yes.

Q. He might have it going through all the different degrees?

A. Yes.

Q. Now, isn't it true there that the loss of capital due to the abandonment of the existing plant in order that a new one may be substituted is a part of the cost to the owner of availing himself of the new invention?

A. I think that is exactly what we provide for in depreciation reserves.

Q. No, I am not talking about depreciation. Just answer the question directly, Mr. Ellis.

A. Do you mean is it a loss to the owner,——

Q. (Intg.) Listen to the question again, Mr. Ellis, and if you follow that I think you can answer that yes or no, and then explain it afterwards.

A. Yes, it is part of the cost of availing himself of the new invention.

Q. Now, if the advantage that will result from the use of the new invention is to diminish the cost of the product and if regulating bodies do as they usually do diminish the rate when the cost of production is shown to be appreciably diminished, wouldn't it be reasonable to expect that the consumers in the time to come would derive advantage from the substitution?

A. You mean any advantage or entire advantage.

599 Q. Either all of it or some part of it?

A. Undoubtedly some part of it; not necessarily all of it.

Q. If the economies resulted in a reduction of the rates the consumers would get a proportional benefit, wouldn't they?

A. To the extent that the rates are reduced, of course they do.

Q. Do they suffer any disadvantage if the rates are left the same.

A. If the rates remain the same he is in exactly the same position as he has always been; if the rates are reduced he is that much to the good; if they are increased, he is that much worse off.

Q. Mr. Ellis, let us go back a step further. Suppose the rates that have been fixed are reasonable over a considerable period of time; in other words, they are about where they would be fixed as a result of the free operation of the law of supply and demand, eliminating now any monopoly element; in other words, they approach an amount which pays the owner the normal cost of production, that would presumably be the point where there would be the largest economic demand for the product, and where the consumers would be getting the largest use from the product, and they would be getting it at a price that was fair and reasonable. Now any change in the price, either up or down, from that normal price would result in a disadvantage either to the consumer or to the producer, would it not?

A. Yes.

Q. Now suppose the owners of the property were told by public authority that they must anticipate the complete abandonment of its existing apparatus because of the possibility or the probability of a new invention that would result in the obsolescence
600 of his existing plant within the next 10 or 15 or 20 years; in order that the owner might receive justice, that it might receive just compensation for the service that he was rendering for the use of his capital, he would have to add a little bit to the price in order to enable him to build up a depreciation reserve, would he not?

A. Yes; in other words he would have to be allowed a sufficient annual allowance of depreciation to compensate for the difference between the ordinary allowance to amortize the existing property and the possible shortened life due to presumed obsolescence.

Q. It would result then in making the price a little higher to the consumer? It would probably result to some extent in the demand being diminished, and might result, even, if that additional amount were too much, it might result in diminishing the demand to a point where the net profit to the owner would be reduced.

A. There would be a possibility under hypothetical cases.

Q. But theoretically the most just and equitable rate from the economic point of view would be the rate that would approximate the normal cost of production including a reasonable return on the investment. That would be correct, would it not?

A. The rate that would give a normal rate of return on the investment, yes.

Q. On all of the elements of cost and no profit?

A. A sufficient depreciation annuity.

601 Q. Let us see about that?

A. I mean that would be my interpretation.

Q. Let us assume that there is some physical wear and tear that should be taken care of; that could be taken care of by proper maintenance and replacement allowances, but here is a given state of the art; no invention of anything better has yet been made, and you have reached a scale of prices that corresponds substantially to this normal cost of production. You would hardly think it advantageous either to the owner or to the public to try to increase that rate so as to make provision for the obsolescence of that part of the plant during the remaining five or ten years that you expect will elapse before the new process will come into use?

A. I cannot contemplate any such condition. My understanding of this equitable rate of which you speak is a rate which gives an interest return on your investment, your operating and maintenance expense, and a provision for amortizing all property. The ordinary functional depreciation of property in gas manufacturing plants as well as in any other kinds of plants is nothing new. There has been cycle after cycle of change and everybody anticipates these cycles of changes. It is not as though a gas manufacturing plant has started with one definite type of coal gas apparatus and nothing has been discovered until there is some revolutionary discovery and it is changed over night.

Q. I am not talking of the frequency of the periods or the duration of the periods, but let us assume now it is possible to ascertain a price that without making a provision for a reserve fund to take care of losses due to obsolescence will afford an adequate
602 return to the owner exclusive of that and also enable the greatest possible use by the consumers who are able to take the product on those terms. Now any attempt to add to that cost to the consumer for the purpose of building up a reserve increases the burden on those consumers, does it not?

A. If you increase any rate to a consumer it means that the consumer pays that much more.

Q. As you increase the rate the consumer may possibly diminish his consumption?

A. Possibly.

Q. Now instead of trying to provide a reserve sufficient to provide for the substitution of a new plant for the old when obsolescence occurs, you continue your charge on the basis of making provision for the cost of production without that, and when the obsolescence takes place, and it becomes desirable to put in a new plant, you continue the rates just where they were until the owner proved the economies effected by the substitution of the new plant could amortize his old plant, aren't you by that method favoring the consumer?

A. I don't see it personally.

Q. What would you do in the case you had charged your existing consumers a sufficiently high rate to provide for the amortization of all depreciation due to obsolescence and we will say the owner had accumulated a sufficient reserve to enable him to erect a substitute plant, at the time of the obsolescence the owner then put in the new

plant and diminished the cost of production we will say 25 per cent,—would you then reduce the rates immediately 25 per cent?

603 A. I don't think it ever follows any such course, I mean the so-called obsolescence in substance don't ever follow any such drastic course.

Q. The percentage isn't material. Suppose we say that the substitution of the plant results in the saving of ten per cent. Would you then reduce the rate immediately?

A. If on a review of the situation by a rate fixing body it would seem to be a permanent affair and there was sufficient latitude in other allowances to the company, I presume they would make reductions in gas rates as other rates have been reduced. I suppose those things would follow the ordinary course.

Q. What I am trying to get, Mr. Ellis, is which method of providing for obsolescence is really more advantageous to the consumer in the long run—the one that charges the consumer with something in addition to the cost of production under the old system, including all regular carrying charges for maintenance and replacements but without including any allowance to provide for so-called functional depreciation, or a method which includes an additional allowance in the rate to cover functional depreciation?

A. Do you want my opinion on it?

Q. Yes.

A. My opinion on the matter is just as I said before, in determining the depreciation allowance, residual life, whether it comes from functional or physical process, should be limited in amount so that provision is made to amortize the property on that residual life.

Q. Then you want to keep your rates high enough to provide for functional depreciation in advance. Is that it?

A. Functional depreciation is an average recurring affair according to our study of the life tables.

604 Q. Have you ever been able to find anything that would justify you in making the statement that functional depreciation is a thing that occurs with any regularity or periodicity?

A. No, it is like anything else, when it is determined over a large number of elements, the law of averages is used, the same as physical depreciation. You can take the physical depreciation of individual elements and some of them of the same type might physically deteriorate in five years, others in fifteen years; you have to take averages throughout, and I think very largely the same will apply to functional depreciation.

Q. Do you think the human mind in the matter of invention works according to any set rules so that you may predict its action?

A. No, but I think that past experience is fairly indicative. To speak particularly of individual elements of a gas plant, that on account of the probable useful life of individual elements of that plants they are items that can be fairly well determined to the satisfaction of engineers involved. I know that in all of your Pacific Gas & Electric plants the probable useful life of all of the elements were admitted by the engineers outside of court and without much discussion. There is a range on that of averages.

Q. Let us take the case where we started in with our plant worth \$100,000 and you estimate that although the plant with proper maintenance and replacements may have an indefinite life, it may
 605 last 50 years or 100 years, or it may last 150 years, *or it may last 150 years*, but basing your conclusion upon the fact that functional depreciation has occurred in the past with reference to other similar plants, you think that the life of this plant will be reduced 20 years, that in 20 years it will be replaced by something that is better and more economical, so you make your provision in your rates for the amortizing of the full value of that plant in 20 years; you have to count on making an annual allowance and then set up an annual reserve for that purpose either on the straight line or the sinking fund method or some other method?

A. Yes.

Q. Suppose you carry out your plant and you reach the end of 20 years and the owner has accumulated a fund sufficient to provide for the entire replacement of that plant, but at that time on inspection and on investigation he finds that the plant has been so maintained or replacements have been made to such an extent and repairs have been made to such an extent that the plant is substantially as good as new, we will say in 90 per cent physical condition, and no invention has been made in the meantime, no advancement in the art and science in improving this particular matter has occurred, and there is nothing to indicate the probability of any invention being made at that time, no more than there was originally, what course would you then pursue, or what course would you recommend to the rate fixing authorities? Would you recommend that they depreciate that plant to zero and give no return for the use from that time on?

A. I cannot conceive of any such condition, Mr. Bosley,
 606 where a plant which you assume a life of 20 years for would be discovered at the end of 20 years suddenly at zero, which has been at 90 per cent condition. I think that long before that the rate fixers would have made an allowance for 20 years life at the start that would have rectified it in the course of 20 years,—I mean that I cannot conceive of any condition where they would suddenly wake up at the end of the twentieth year and put a plant on the books at zero which was in 90 per cent condition. I think the rectification would come in the fact that they would consider your annual depreciation allowance too high.

Q. Let us take that case right there. You say if you found that anticipated invention does not occur and consequently the danger of accumulating too large a reserve for replacements, you think the rate fixing body would probably cut down the allowance. That is your attitude there, is it?

A. To put it in these terms my interpretation of it is if they found that their provision for amortizing the property, their annual depreciation allowance was accumulating too rapidly, they would cut it down.

Q. I am assuming it is not accumulating too rapidly, that it is accumulating just exactly in accordance with the original computa-

tion, basing the computation upon the estimate of 20 years' life from the beginning, and you don't know and you cannot possibly tell at the end of 15 years that the obsolescence is not going to take place at the end of the twentieth year?

A. I cannot conceive any condition of that kind, Mr. Bosley; I mean personally I cannot from my experience conceive anything like that.

607 Q. Can you predict invention five years from the event?

A. Not necessarily predict a new invention, but you can possibly predict the effect of a new invention, that is as to whether it takes the place of something else.

Q. If an invention has been made and has been developed and tested you then may make some prediction as to how soon it will be proper to substitute a new invention for the existing apparatus, but until the invention has been made, have you any basis at all as to when that invention will be made, whether in one year or twenty years, or ten years or one hundred years?

A. No more than to say in speaking of invention in the gas situation here, the general progress in gas making is shown in improvements from time to time, changing from coal gas to water gas, subsequently to various types of oil gas; it has been a gradual development; no drastic affair, no development of any process overnight, but it was a gradual development, the same as could exist today, if your company were called on to make gas from some other product, you would probably have to make it out of some of the cheaper ligneous coals of California, or something else.

Q. Let us take the case where your estimate would work the other way. Suppose you started out making your reserves for depreciation due to obsolescence and what we call functional depreciation on the basis of an estimated life of 20 years, and at the end of five years you suddenly discovered that a new invention has been made which revolutionizes the art and makes it desirable to substitute a

608 new plant for the old one. What remedy will you have there, if the owner has been allowed to accumulate from his rates only a reserve based on the theory that the plant will have a 20-year life, at the end of five years he will not have a reserve accumulated sufficient to make the replacement, will he?

A. Is he going to substitute a new plant for his old plant on account of some invention?

Q. Yes.

A. Of course, the economic consideration would be if he had not accumulated enough reserves he would expect to recoup his losses through an increased allowance. I mean that would be one of the economic conditions.

Q. You would not think it would be exactly a square deal for the owner in that case to require him to write off his old plant as abandoned and fix the rates from that time on the basis of a return on the new investment alone, and let him suffer the loss of the difference between the reproduction value of his original plant and the amount of reserve that he had accumulated at the end of five years?

A. I don't know as I quite follow you. If it transpired that there was a condition of that kind, it probably would not be fair.

Q. On the other hand, do you think it would be fair to the public where the invention that resulted in the progress in the art and science instead of occurring at the end of 20 years did not occur until the end of 50 years to require consumers to continue throughout the entire period of 50 years to pay rates based on an estimated reserve sufficient to amortize the value of the plant in 20 years?

A. As I tried to state before——

609 Q. (Intg.) Just answer the question as it is.

A. I cannot answer it in that form. Either I am confused or I cannot quite follow you.

Q. Just read the question again and I think you will find the question clear.

(The last question repeated by the reporter.)

The Master: He does not admit the possibility of your hypothesis.

Mr. Bosley: Let him answer the question with that hypothesis.

A. I am trying to assume so many different things, Mr. Bosley, that I do not quite follow you.

Q. I really think that you can answer that, Mr. Ellis. I do not believe it is a case where you cannot. I will ask that the question be read once more.

(The last question repeated again by the reporter.)

A. Yes, I would like to qualify my answer.

Q. You may qualify it.

A. It is yes, on our whole consideration of the amortizing of these investments and what you call the obsolescence theory, but it is not considering an individual element on which we set up an approximate useful life of 20 years, and expires in 15 or expires in 25 years. The whole study of probable lives and their reflex action on depreciation allowances is largely influenced by the fact that in the group of following items which are probably more or less compensating in their aggregate results, if we were fixing a definite life for
610 a gas generator, and we set up a depreciation on the basis of 20 years life, and it runs on to 25 years, you might say the consumer, of course, is suffering; on the other hand, we are taking large elements of the distribution system, meters and so on, on which are all kinds of varying conditions, and the best that can be picked out is what would be fair averages, that is, more or less compensating. That is the idea I am trying to convey, and it is hard for me to think of these things as hypothetical units and that causes my difficulty in answering the question.

Q. I understand that your position is that you think that an error one way may be compensated by an error another way?

A. I do not think there is any question of error at all. It is a question of judgment at the best. I mean nobody knows the absolute life of any physical element.

Q. Then doesn't that reduce the problem to practically one of insurance, that is, to an insurance basis; in other words you have to get together a lot of actuarial data from which you form a judgment as to the probability of certain things happening?

A. Not necessarily.

Q. (Continuing)—how often they will happen in a thousand instances or ten thousand instances, and then you work out an average which you think will work out substantially a result that is fair to both sides?

A. Not necessarily. In our study we did this: We knew the age of a large number of the elements of the property; we determined, on the best judgment of the engineers concerned, as to the probable expiration of that particular piece of property, that is, the expiration of its life, which was covered in most instances, as far as the plant is concerned, by a development program outlined by their engineers; it was simply a question of calculating the age and remaining life and determining in those instances what the probable life was. Over another range of structures, such as meters, it was not a question of figuring up average lives on meters as determined by 101 engineers around the country; we had a study made of actual lives of a large number of meters taken from the Pacific Gas & Electric Company's records, and we did the same thing in services, and we determined what the average life was from as many elements as we could get, and we thought that is the very best indication that could be gotten. Of course, if we had had ten times as much information as we had, we could have had ten times more facts on it, but I doubt if the accuracy of the result would have been influenced materially one way or the other.

Q. You don't know whether it would or not?

A. I don't know. We got every bit of information from the company.

Q. Isn't that a thing very similar to the problem of insuring against casualties?

A. I do not see it. I would say this, I don't know it absolutely, but I feel assured from familiarity with the law of probabilities, from the range of items that we considered, that the ultimate average would not have materially varied one way or the other,—even if we had had twice the number of elements, that that 15 years life would not have fluctuated more than one year one way or the other. I am not absolutely certain of that or positive that it can be demonstrated absolutely mathematically, but under the ordinary law of probabilities, if there were a large range of individual elements it could not be much out of the way.

Q. What you call the law of probabilities is based on observation and experience, isn't it?

A. Yes.

Q. That is not obtained a priori?

A. No, it is empirical.

Q. That is, what happened was that you got enough happenings of all kinds together and then you struck an average?

A. Surely.

Q. And that sort of an average is used by accident insurance companies and the life insurance companies in determining what the premium is that they will be willing to accept to undertake the insurance for?

A. I presume that is what is done by insurance companies, the difference being, of course, in our case that we did not take any general averages. Our studies were all confined to actual properties of the P. G. & E. Company and facts connected with this company.

Q. Your actuarial data was a little more restricted than the data of the insurance companies which carry on a general business throughout the United States as a whole, or perhaps the United States and Europe, or perhaps the United States and parts of Asia?

A. The situations are not comparable; in other words, data gathered from fifty eastern cities on the life of meters probably would be of little interest to us in San Francisco although it might be
613 of considerable interest if a similar study had been made on the prevalence of tuberculosis or the number of accidents which is a little different proposition.

Q. You have got a case where local conditions may affect the result?

A. Local conditions and the type of installation.

Q. Now, Mr. Ellis, do you know how long iron ore has continued to exist in the earth?

A. How long iron ore has?

Q. Yes.

A. No, I do not.

Q. You assume that it covers some geological period?

A. Yes, prior to my time.

Q. Suppose now we take cast iron, which as I understand it is iron, that is in its simplest manufactured form, or most nearly approximates its natural condition, can you attempt to predict the future duration or existence of that piece of cast iron?

A. No. I understand that there are cast iron balls discovered in India that possibly date back 1,500 years, and cast iron pipe in France probably two hundred years old, in good condition today.

Q. Haven't they found cast iron pipe much older than that in France and in England?

A. I guess that was about the beginning of the making of cast iron pipe, possibly 200 or 250 years ago.

Q. Do you know anything about what the condition of that pipe was after 200 years?

A. Very fair, I believe, this particular piece that I have reference to. Cast Iron pipe has an indefinite life in certain classes of
614 soil.

Q. Then with cast iron it may be said there is no natural or definite limit to its period of existence?

A. There is with the smaller pipes.

Q. I am talking about cast iron generally, the substance I mean?

A. Cast iron, you cannot foretell the length of time, if it were put in proper soil conditions or not exposed to oxidation.

Q. Then the question of whether or not its existence will be limited may be dependent upon conditions locally affecting it; that will be true, will it not?

A. Assuredly.

Q. If cast iron is placed in a position where it is not exposed to oxidation or not exposed to strain or pressure, it may last forever, may it not?

A. It might.

Q. If it is exposed to oxidation you probably could ascertain about how rapid is the progress of oxidation, by observing it over a period of time, couldn't you?

A. With sufficient facilities you possibly could.

Q. You might be able to tell how long that iron would last when subjected to particular substances?

A. Yes, depending on the thickness.

Q. Suppose you subjected a piece of cast iron to electrolytic action: If you had tried enough experiments you could probably predict about how long it would take for the action of the electric current to make a hole through the iron pipe?

A. Yes.

Q. But in the absence of that electrolytic action, you don't
615 know how long that pipe might continue to exist without any hole in it?

A. No.

Q. Electrolysis is occasioned by some defect ordinarily in the construction of an electric railroad or in the construction of electric transmission lines, is it not?

A. It is due to stray current.

Q. Where construction is proper the cast iron mains probably would not be subject to electrolytic action at all except here and there where some negligence has occurred on the part of somebody else?

That would be purely a casual happening, would it not?

A. Yes.

Q. You would have to class the result of electrolysis as among casualties or accidents to the pipe?

A. Yes.

Q. If they happen they produce the result, and if they do not happen the result is not produced?

A. Yes.

Q. Now suppose you found under given conditions there were about so many, there were a certain number of cast iron mains affected by electrolysis up to the point where leakage took place, and they had to be replaced in the city, you might make a fair estimate of about how much of an allowance you ought to have to replace gas mains due to electrolysis in any given time?

A. Yes, just like a study.

Q. Assuming you have carried it under casualties and you find every year the cost of replacement is so many thousand dollars, you would think that was a fair indication of your amount for that?

A. You mean on repair work?

Q. Yes.

A. If your stock remained practically the same your re-
616 pairs would be probably more or less constant.

Q. But as to the gas mains that were not subject to these casualties, their duration of life would not be shortened at all by

the fact that some other gas main was rendered leaky and defective as an effect of electrolysis?

A. You mean where gas mains are already serving their function as gas mains?

Q. I am talking about the gas mains being in the ground in condition to serve?

A. If I understand you, there may be mains unaffected by electrolysis that will serve their function as pipe indefinitely, presuming they had a function to serve and presuming they were adequate.

Q. The only thing that would be necessary to keep the distribution system consisting of cast iron pipes in perfect service condition would be the repair of these pipes that had been subject to the casualties, assuming naturally there was nothing else operating on them to cause them to deteriorate?

A. If there was nothing to operate on them to cause them to deteriorate, their physical condition would remain very good.

Q. How is it with reference to oxidation in the case of cast iron mains placed some distance under the soil here, as conditions are in San Francisco, does oxidation progress gradually until the cast iron mains are eaten through, or does it appear to develop only to a certain extent and then stop?

A. It seems the pitting of gas mains is practically all from the outside; I have had more occasion to see the effect of the soil conditions on water mains than on gas mains, but there seems to
617 be quite a little difference, depending upon the part of the city that the mains are laid in, possibly due to some chemical element of the soil, and also the fact that whenever there is filled ground causing the exterior action on the pipe, it seems to be much more rapid than in the sandy districts; the sandy district which covers about two-thirds of San Francisco is an ideal condition for pipe laying; a pipe in a lot of this wind leached sand will probably last indefinitely so far as exterior action is concerned.

Q. Have you ever found any case where gas mains or water mains are laid in the sand that the process of oxidation has ever gone beyond the mere surface?

A. Very slightly from any examination that I have made; I have seen numerous samples taken out in connection with the Spring Valley case; that is where I had occasion to see it.

Q. If you should find in any particular place the gas mains were affected by local soil conditions it is quite possible that you might by ascertaining what the chemical was in the soil that affected the pipe provide for protecting the pipe against the action of it?

A. In that situation it is customary if you know ahead of time to pack the pipe in a sand cushion; that is to prevent the exterior action.

Q. Now, Mr. Ellis, in your direct examination I think you said that, in effect, your study of depreciation included physical depreciation that was due to wear and age and the functional
618 depreciation that was due to changes in the art and science and possibly to changes in economic and industrial conditions. Now can you point to a single instance in the plaintiff's

gas manufacturing and distribution system in San Francisco where the element of age taken by itself had anything whatsoever to do with the duration, or has had anything to do with the condition, the physical condition or the service condition of that property?

Mr. Searls: Do you mean its age as distinguished from the action of the elements?

Mr. Bosley: Age as distinguished from the effect of wear or the effect of corrosion or erosion?

A. I made no attempt,—you misunderstand me,—in my study; I made no attempt to differentiate between age and the effect of wear and tear. I made the general statement that depreciation usually is considered under two general heads, physical and functional. That was as far as my study went. I did not attempt to differentiate between the two, as I thought it was futile.

Q. Now on page 3030 of the Transcript you have this heading: Physical Depreciation Covering Wear and Tear and Loss Due to Age. Can you point to any single element of the plaintiff's property in San Francisco where there is any loss due to age as distinguished from wear or some chemical action, or some casualty?

A. I don't know that I quite follow you. You are speaking specifically of any parts of the property that are affected by physical deterioration?

Q. I am speaking of physical deterioration?

619 A. As far as attempting to differentiate between age and wear and tear is concerned it would be impossible for me to tell on a meter which is deteriorated and ready to go to the shop as to how much of it is due to being in a damp place and how much due to being three years old. I mean that is an absolute impossibility.

Q. Now, Mr. Ellis, isn't it the fact that the entire property used by the plaintiff in the manufacture and distribution of gas is made up of inorganic matter?

A. To a large extent.

Q. I do not think we have any live stock included in our inventory?

A. Your wooden buildings are not very extensive; the pipe, meters, services, and your plant equipment are largely steel and cast iron construction.

Q. The plant is made up chiefly of iron and steel and brick and cement and other things of that sort. Of course where there is some wood used that is organic in its nature, but after the life of the tree has ceased and the wood has been seasoned it is then similar in its general characteristics to inorganic matter, is it not?

A. No, your wood rots; a wooden structure naturally of course will rot out.

Q. Wood will decay if subjected to the alternate action of moisture and dryness, but a piece of timber well-seasoned and protected from the elements will last indefinitely, won't it?

A. Well, I would not say that; it depends on what your protection is; if you can get timber in such a shape that it will last in-

620 definitely, you have solved the railroad bridge situation to a certain extent.

Q. You know of wooden buildings or frame buildings that have attained the age of 100 years or more, don't you?

A. Yes.

Q. You might have to replace the sill next year where it is affected by moisture but the frame-work of the building will be perfectly sound?

A. Of course you can get timber that is very short-lived and deteriorates rapidly; you can take redwood and submerge it in mud and it will not deteriorate; I have cut out redwood from wharves that was like cast iron; but it was kept away from any atmospheric exposure as a general rule.

Q. But if we eliminate the wood and timber in the plant, we have got all the rest inorganic substance that may last forever except where it is subject to some erosion or corrosion or some wear?

A. Yes, if they were not subject to any external influence, undoubtedly, the steel would last indefinitely.

Q. There is no necessary limitation on the life of any of this property, no age limit that you can predict on property of this kind?

A. I don't know that I quite follow you; taking a specific instance, speaking of the buildings covered with corrugated iron covering, that you have on parts of your buildings, that deteriorates rapidly and is being replaced all the time.

Q. But why?

A. Because it is exposed to the elements.

Q. Oxidation takes place?

A. Yes.

Q. But that piece of corrugated iron being protected from
621 oxidation will last as long as your cast iron mains, will it not?

A. It depends to what extent you can protect anything. Of course, I mean it would be foolish to attempt to put any such protection on as to make it of indefinite life.

Q. The thing I want to bring out is, when you are dealing with inorganic substances which have no life, you are dealing with an entirely different subject-matter than when you are dealing with living beings?

A. Oh, yes.

Q. In the case of a human being and all other animate objects, so far as we know, there are pretty well defined limits of life beyond which they are not at all likely to go even if they escape accidents?

A. Yes.

Q. But if you are familiar with life insurance you know that the human expectancy of life is a progressive thing, don't you?

A. Yes.

Q. Do you know why that is?

A. I never have given it any particular study; you mean the fact that after a certain number of deaths have occurred in a certain cycle, that the probability of remaining life is higher in the remainder?

Q. I am speaking of the individual. Suppose an individual man has an expectancy of a certain number of years when he is 21; when he reaches 30 his expectancy was probably not as long as when 21; but is still considerably longer than the unexpired part of his expectancy at 21.

A. I understand that.

Q. Why is that?

A. I don't know, I have never given that study.

622 Q. Life insurance involves the payment of compensation upon death, does it not, whether that death be due to the man having reached the end of the normal life or be due to some disease, or some casualty?

A. Yes.

Q. Now, when that individual has escaped diseases and casualties and their consequences during that period of years and is still in good condition it is perfectly natural to assume that his expectancy will be increased because he has passed by a great many hazards, hasn't he?

A. I presume so; I am not familiar with the theory of it.

Q. Of course, he is approaching nearer to the natural term of life?

A. Yes.

Q. And his expectancy is lessened because of that, but his expectancy of life so far as it is dependent upon mere casualties is not affected by casualties which he has escaped, is it?

A. Not at all.

Q. With life insurance of human beings you have got two elements of risk, one the natural termination of life, and the other the termination of life due to casualties. Now, the gradual progress from youth to old age is a continuous one, but the element of casualty, accident, including disease, isn't a thing that is gradual in its progress, is it?

The Master: I don't think Mr. Ellis is offering himself on that subject?

A. I was interested in your discussion, but I was not trying to answer it.

Mr. Bosley:

623 Q. The man at thirty who has escaped all the accidents, all the casualties, would so far as future casualties are concerned be just as good a risk as the man at thirty if he were being insured only against casualties?

A. I should presume so.

Q. Now then, to carry that along over the insurance of inorganic substances: You eliminate entirely the natural life period when you are dealing with inorganic substances, don't you?

A. You eliminate the natural life, you mean?

Q. Yes.

A. That there is no termination of the natural life of inorganic substances, you say?

Q. That is it.

A. But there is. Your inorganic steel wears out.

Q. I am not talking about wear.

A. I am afraid, Mr. Bosley, that I cannot answer that question.

Q. Is there within your knowledge of substances any natural limit of the existence of iron, or steel, or cement, when it is not exposed to wear or some chemical action?

A. Or some interior electrical action?

Q. Yes.

A. If it is not subjected to any one of those things undoubtedly it would last forever, I presume.

Q. When we are dealing with insurance for human beings we have got double risk, that is where we have got to take into consideration the peculiar phenomena that are connected with animate existence; when we are dealing with inorganic existence we have a different problem than that?

A. I am not familiar with human insurance, but I should imagine it had a decidedly different aspect to it.

624 Q. In the case of all inanimate objects, in the case of all inorganic substances, there being no necessary limit of life to them, what we have got to guard against is such things as wear and such things as strains resulting in breakage or some chemical action or some electrical action?

A. Yes.

Q. Now then, if we find as a result of probabilities that certain apparatus will have a serviceable life under certain conditions of 20 years because of the fact that ordinarily that material is subject to certain strain, or to the danger of certain casualties, and if at the end of that 20 years, you make an examination of that particular article that is made of inorganic substance and find that that has escaped all of the casualties, has not been affected by them, and that its physical condition is the same now as it was to begin with, is there any reason why we should not assign to it a further life quite equal to its original life?

A. For that specific case?

Q. For that specific case?

A. Surely, if your first guess is wrong.

Q. It is not a case of your first guess being wrong, but it is a case where this particular unit has escaped the casualties. It is one that has escaped them for a long time while perhaps others have succumbed to it.

A. In a compensating series of elements I think you would be hardly warranted in increasing the life in one feature and cutting it down in another, above and below your average, unless you found your entire average was wrong. Of course that is relative purely.

625 Q. Your average might be reached, but in a particular object your estimate of its life is all wrong because it has escaped all these casualties?

A. Surely, but on the other hand you probably have made an estimate of too long a life on something which has practically expired.

Cross-examination (resumed Tuesday, December 18, 1917):

Mr. Bosley: Mr. Ellis, I have one or two questions more with reference to obsolescence. In the first place, Mr. Ellis, if you were an owner of a gas plant and distribution system and if your present generators represented an investment on the basis of reproduction of \$100,000, and your generators were all in perfectly good physical condition, but after you had installed those generators somebody else had invented a new process and a new apparatus, and had conducted experiments on an operating scale with the new apparatus and new invention so that he had really demonstrated that his new process and apparatus covered by his patent were useful and would result, if put into use, in making substantial savings; suppose under those conditions the owner of the patent should come to you as the owner of this particular gas works and say, "Mr. Ellis, I offer to set up and install complete new generators constructed in accordance with my new invention, and to put them in condition for operation, and I offer to furnish further not only the labor and material required in setting them up, but to put them in condition for operation at my own expense, on condition, however, that you will use them to effect such savings as will probably be effected by the use of this new process and apparatus, as compared with the old, and that you will pay to me the savings effected by the substitution of

627 the new apparatus and new process for the old, until such time as I shall have been completely reimbursed for the cost of installing the new apparatus and putting it into condition for operation, and thereafter and during the remaining life of the patent you are to pay me 50% of the savings effected by reason of the substitution of this new apparatus and new process," and suppose that offer was the final offer made by the owner of the patent, the best offer that you could get out of him by way of negotiation, would you consider it good business to accept that offer, involving, as it would, the abandonment of your existing generators?

A. I don't know. I do not think I could give an off-hand answer on that, just under these circumstances, whether it would pay to abandon the present generators,—as to what I had accumulated toward the amortization of the present generators—

Q. (Intg.) Wait a minute. You are bringing in some other factors. I want an answer to my question as it is, first, and then if you want to elaborate afterwards you may.

A. I cannot answer your question—

Q. (Intg.) I think you can if you will study it a little bit.

A. I cannot give you an answer.

Q. Let me add one further assumption: Let us assume that the new generators represent an investment of the same amount as the old generators. And I will add one further assumption there, let us assume that the savings to be effected by the use of the new generators in the manufacture of gas was of such magnitude that if

628 you continued your operations as you have good reason to expect them to be continued the amount of the savings to be effected before the expiration of the patent will be sufficient to discharge much more than the cost of the new apparatus; let us assume that the savings would effect an amortization that would be sufficient to repay the owner of the patents for the cost of installing his new apparatus, in one-half of the unexpired life of the patent, and then beyond that period the savings would be divided on the basis of 50% to the owner of the patent and 50% to be retained by you as the owner.

A. I can't give you any snap-shot opinion on it, any more than if I were a plant owner and a man had submitted a proposition like that to me I would answer him over the table; I would have to take the thing under consideration; I mean I cannot give an answer to that.

Q. What is the difficulty?

A. As I say, I would have to consider the condition of my existing apparatus, as to what the possibilities were for its expiration, as to how much I had accumulated toward the amortization of that, and there are various considerations—I mean it is a subject that I would require some deliberation on.

Q. Now, let me remove that source of your trouble. Let us assume that your existing plant was one that had been brought to the highest state of efficiency, and that you had not accumulated any reserve at all, so that it represented, at the time of the offer, an investment of \$100,000, and your plant was in its highest state of physical perfection, just about in the best operating condition.

629 A. I would be glad to give an opinion on that subject, but

I would not do it as any business man or as an advising engineer, give a snap-shot opinion, and any expression of "Yes" or "No" on my part now would mean the thing one way or the other. I think it is too involved a proposition to answer as rapidly as that.

Q. I think it is really very simple.

The Master: The witness does not see it so, Mr. Bosley; I think you have the answer.

Mr. Searls: If counsel would furnish us with an edited edition of these questions of his which take a page or two, we would make a study for him.

Mr. Bosley:

Q. Mr. Ellis, what risk would you, as owner, run in accepting such an offer as that detailed in my last hypothetical question? Would you have to make any additional investment at all?

A. Not on your hypothesis, as I understood it.

Q. No additional investment. You have your existing generators there so that you can use them if the owner of the patent does not make good in his offer of construction of new ones. You do not have to abandon anything. Your own plant is left entirely unim-

paired. The owner of the patent simply offers to erect new generators representing an equivalent investment to that which is represented by your own generators, he advancing all the money, all the risk, and you know as a result of the testing out of the actual operation of this new apparatus in another plant, where it has been in actual operation, that it operates well, and that the savings
630 resulting from its operation are substantial, as compared with the operation of your existing plant. Now, all that is assumed in the question, is it not?

A. What is the question now?

Q. Now, then, the question further assumes that the savings effected, if set aside as a fund for one-half of the unexpired life of the patent, will be sufficient to pay off the entire cost of these new generators, and the owner of the patent has offered to install these, put them in readiness for operation; you are simply applying the savings effected in the manufacture of the gas first to his reimbursement for the construction of those generators, and from that time on, which would be for the remaining half of the unexpired life of the patent, you would pay him one-half of the savings resulting from the use of the new apparatus, and you may retain the other half. Have you anything to lose on it?

A. Am I permitted to earn a rate of return on both plants, is that the idea?

Q. I did not say anything about that. We will assume now that the rates would be the same as if you had continued your old apparatus, that they were neither increased or diminished.

A. I could not answer your question without deliberation, any more than I would attempt to answer a man if a man came to me as a business proposition, without considering it.

Q. What would be the effect, Mr. Ellis? Would your investment be increased at all?

A. If the other man put in the plant?

Q. Yes, at his own expense.

A. No, the investment would not be increased.

631 Q. Your investment would not be increased a dollar, would it?

A. Not if he put in the plant.

Q. And under the supposed condition, suppose the unexpired life of the patent was 15 years, at 7½ years the savings would have entirely paid for the new apparatus and then it would be yours, and your existing apparatus, your old apparatus, would be in a condition where you could scrap it and get any residual value out of it at any time after his new one was put into operation.

The Master: What is the question?

Mr. Bosley: Can you see where you would stand to lose a dollar?

A. I don't know. As I say, I would have to deliberate over the proposition. I cannot give you a snap-shot opinion; probably my mind does not work as rapidly as it might on these matters, but I cannot give a snap-shot judgment on it.

Q. I have given you a perfectly self-evident proposition, one where there is only one answer possible, Mr. Ellis.

A. I am not trying to evade an answer. I don't know that I follow exactly—as I understand it—let me see if I understand you: You are putting up a hypothetical proposition, a business proposition that a man comes to me as the owner of a gas plant with a new invention, and he makes me an offer as to what he will do and what the savings are, and so on, and will I accept it—I would not give him an answer without deliberation on the matter and thinking over all its aspects. I do not think it is as simple a proposition for answer as that.

632 The witness, recalled for further cross-examination, on December 28, 1917, and being requested to give his answer to the foregoing hypothetical questions asked him on December 18, replied:

A. After reading it over, Mr. Bosley, it strikes me that the proposition the patentee is putting up to the owner is a very fair one, and I think I would personally be inclined to accept it, but I would prefer, if such a proposition were put up to me—I certainly would take it up with some of my confreres in the matter, for the reason that as I understand it there is a possibility—there is a splitting of the profits during the life of this patent, or a splitting of the savings between the old process and the new process, and of course to the extent that there might be some innovation come on in from some other patent, that might still further cut the thing down, to that extent there is a certain element of chance; however, on the basis of it, I consider the proposition a very favorable one.

Q. The proposition as I remember it was that the owner of the patent would offer to install new apparatus and do it at his own expense, and on condition that he be reimbursed for the entire cost of construction of the new works out of the savings effected by the new process.

A. Yes, as compared with the old.

Q. And after he had been fully reimbursed for the construction of the new apparatus, then the savings were to be divided half and half between himself and the owner of the plant.

633 A. Until the expiration of the patent—I would say personally, although I am no manager of gas plants, that it looked like a very favorable proposition.

Q. If you could get a more favorable proposition you would probably try for it?

A. What I would do probably if a man came in with a proposition of that kind, and there was an element of chance that there might be further innovation, and I doubted whether I would want to split the economy between the old process and the new process, the chances are I would offer him some sort of interest or salary to stick in and take a chance with the balance of it.

Q. There might be any modification of it. The real purpose of the question is whether you thought it would be to the interest of

the owner of the plant to accept such a proposition, assuming that was the last and best offer that he could get?

A. I think so.

The following is a continuation of the cross-examination of Mr. Ellis:

634 Q. Now, Mr. Ellis, your study of depreciation, as I understand it, included all of the elements of depreciation, that is not only physical depreciation, but what you call functional depreciation?

A. Yes.

Q. You made your estimate on that basis?

A. Yes, I combined the effect of the two.

Q. If, as a matter of fact, functional depreciation due to obsolescence or inadequacy is not properly chargeable against the past but is properly chargeable against the future, the entire foundation of your study would be undermined, would it not?

A. Not absolutely; my study was primarily based on probable lives which reflected the combined effect of functional and physical depreciation; I mean those were basic facts.

A. (Continuing:) If physical depreciation only were to be considered, and functional depreciation were not to be handled in the study, of course it would necessitate an entire difference of probable lives, that is of probable physical lives, and not useful lives.

Mr. Bosley:

Q. The result of your study would be utterly inapplicable if functional depreciation were properly and as a matter of law to be eliminated from the consideration of the extent of the depreciation and the present value?

A. Oh, yes, if obsolescence were to be considered in the light you speak of, that is, of functional depreciation, not only obsolescence—I consider them all in the same category—the results of my computation would be materially altered; the annual depreciation allowance would be very much less and the percentage condition

635 of the property would be higher.

Q. The percentage condition of the property would be higher?

A. And the annual amortization allowance would be very much less.

Q. It very likely would be unless, as a matter of fact, the provision for obsolescence that had already occurred in the past was of such an amount as to make up the difference; in other words, if your allowance for obsolescence is projected into the future, that is from the point of time when that part of the plant is abandoned for obsolescence, then the amount to be allowed for obsolescence will have to be determined by reference to previous abandonment?

A. Well, my studies did not contemplate anything of that character.

Q. You said it did not?

A. If that were true, the results of my studies would not be of service.

Q. They would not be of service. If depreciation due to obsolescence is to be treated in one way, that is, by projecting it into the future and making it a charge against operation under new and improved methods or apparatus, and if the depreciation due to wear and to gradual operation of natural causes to which the plant is subjected is to be treated as something to be taken care of concurrently with the deterioration, then you would have to make an entirely new study of the subject, would you not?

A. Yes, the study of the subject would be along entirely different lines.

Q. The present value would be affected in one way and the amount of the annual allowance to make up for this depreciation
636 to amortize it would be determined in an entirely different way.

A. Yes.

Q. The amounts might happen to be the same or might happen to be widely different?

A. Yes.

Q. It would not necessarily follow that the present value would be higher and the annual allowance would be greater in every case?

A. Not if it is figured on an entirely different base; it necessarily would not have to conform to any relation shown in a study of this character.

Q. Well, now, Mr. Ellis, are there any other causes of depreciation than those you have mentioned, that is, functional depreciation, including obsolescence and inadequacy, and physical depreciation due to wear or the action of the elements, some physical deterioration to a part of the plant—

A. The term "functional depreciation" is often used to cover something even broader than obsolescence and inadequacy; there is a type of depreciation that may occur that I ordinarily consider in the same category as functional depreciation, which is this, that a piece of apparatus may neither be obsolescent nor inadequate but it may have to lose its value on account of its position; for instance, a case in point occurred, I believe, in our study in the scrubbers at the Potrero; they contemplated having to remove them on account of being in the way of future development; although the scrubbers were of a modern type and were adequate, it would mean removing them elsewhere, and there would be a loss to the extent of the foundations, and so on; that usually falls in the same category.

Q. That would result in some loss due to the necessity of removal?

A. Yes.

637 Q. When re-established in the new place, they would again have the value that they had in the old place?

A. Yes, but—

Q. (Intg.) But the value would not be increased by the cost of making the removal?

A. There would be an absolute loss to the extent of the foundations and so on that you abandoned.

Q. It might happen in the case of a removal of a part of the plant that way that the loss would be made up by an increased efficiency in the new location, might it not?

A. Yes, but considering that particular element, I mean if we were considering an individual scrubber, I am speaking of a case we did consider in determining probable lives, we considered that scrubber probably would have to be removed inside of a certain period on account of being in the way of future development; so far as these individual scrubbers in their present position were concerned we shortened the life naturally; in the present position we considered the shorter probable life, and that would reflect into a more depreciated condition under my line of study.

Q. Was that a case where there was any actual depreciation in the thing itself, or was it a case where simply by reason of the necessity of a removal, a part of the original structure has been abandoned and new structures been substituted in its place?

A. Of an entirely different type.

Q. That is not a depreciation in the unit itself, is it?

A. No, it is an absolute loss of a part of the unit.

Q. It was an abandonment, perhaps, of the foundation and some cost in making the exchange in location?

A. Yes.

Q. What would you do with the case where the location of mains in the street was ordered changed, either by municipal or state authority, in order to accommodate increased traffic on the streets: Is that a depreciation, or is that one of the expenses incident to general development of the community?

A. Do you mean what would be my treatment?

A. No, I ask you what is it. Is that a depreciation of plant?

A. It is not a depreciation in the sense of being any physical depreciation. If in the ordinary course mains have to be removed on account of civic conditions, I think they are in the same category as mains that become inadequate through sudden development of loads; in other words, there will be an average shortening of lives.

Q. How do you work out shortening of lives? Suppose you have mains that are entirely adequate, will probably be adequate for the next 50 years, no one knows when they will become inadequate, but in order to accommodate the construction of a street railroad or sewers or possibly a subway the city determines it is necessary the location of these mains shall be changed, and you as the owner proceed to take them up from their present location and remove them to a new location and re-install them in exactly the same way as they were previously installed, they are put down in the same way, under the same pavement, and with the same conditions and the mains you find are in perfect condition, the main in its new location is worth as much as the old main was in the old location before the necessity for the change arose, was it not?

A. Yes, my idea, if I may explain the way that was handled,—

Q. (Intg.) There is no depreciation in that main as a part of the distribution system, is there?

A. There is a loss of money.

The Master:

Q. How did you handle that?

A. We handled that this way: The thing was of considerable moment in the matter of two-inch wrought iron pipe in this system. The ordinary life of two-inch wrought iron pipe laid in sand would probably run 25 or 30-odd years in San Francisco, based on experience with water companies; the two inch pipe of the gas company has been largely used as temporary mains in ungraded streets where it will be put on in and after the city officials have determined the grade or determined to pave the street, or something to that effect, the company would then remove the two-inch pipe; it might have been in five years, say, and they then put in their permanent pipe; it would not justify, prior to that, putting in a permanent pipe, not knowing the grade; the two-inch pipe would be removed, and if in good physical condition would probably be transferred elsewhere. There was a vast movement of that sort in the San Francisco distributing system, and the way we handled it was this: We gave the aggregate probable life of two-inch pipe of 15 years. These individual pieces of pipe might have been moved and might be moved several times; as far as the pipe itself was concerned, it might last 30 years in different locations; at the same time the installation of the pipe, the removal, the teaming, transferring, etc., are all lost; so in our study, in the joint study that was made by the engineers of the company and myself, in determining the probable life, which
640 was the basis of all my calculations, we used those elements and determined an average life of 15 years.

Q. Suppose this condition: Suppose out here on Market street there was a very large cast iron main which would be given the longest life that you would assign.

A. Yes.

Q. And a subway construction is made by the municipality which requires the moving of that main over a number of feet or maybe to another street, and an expense due to that which does not help out the system at all has to be incurred. Do you reflect that possibility into your life and pay for it out of your depreciation allowance, or do you consider such changes as that in operating accounts?

A. A change of that character would be an operating account, and that is the way the company handles it. The company has occasion every once in a while—while I possibly did not catch the purport of your question, the company may perhaps very often transfer a pipe on account of possibly sewer construction, or so on, and they charge that in their operating expense.

Mr. Searls:

Q. They are doing it on Market street now, aren't they?

A. They are operating on Market street. As to what exactly they are doing, I don't know; I think it is electric.

Mr. Bosley:

Q. When the pipe has been changed in the case that we have been talking about, assuming now the case stated by the master, and you were then called upon to appraise the gas main after its distribution, would you appraise it in its new location at the same value as
641 at the old location, or at a greater or less value?

A. Under the circumstances you state, all the conditions being the same?

Q. Yes.

A. I would appraise it at the same value.

Q. That is, if you were trying to ascertain the cost of reproduction, you would assume that the cost of reproduction in its present location would be the same as the cost of reproduction in its old location?

A. Yes. That was the principle that was followed in this whole appraisal.

Q. Possibly if you were the owner of the system you might think that the value of the gas main in Market Street in its new location, where it had been changed to accommodate the construction of other municipal improvements in that street was worth a little more than it was at its original location because it is probable now that the necessity for again moving it is much more remote than was the probable necessity for removing it in its former location?

A. You mean would the owner possibly consider it?

Q. I say, wouldn't you possibly consider that?

A. An owner might, an appraiser would not.

Q. If you were appraising it on the basis of reproduction it would not make any difference whether it was in the middle of the street or on the side of the street?

A. I mean he would take into account all physical facts, but naturally he would not be in a position to understand how much excess value it would have due to its service conditions, or possible
642 subsequent removal.

Q. If you were considering purchasing the plant, however, it would make some difference to you whether the anticipated necessity for removal had arisen and had been yielded to or whether the anticipated removal was so removed that you probably would not have to make any changes in the next 25 or 30 years, wouldn't it?

A. Yes,—you mean if I was considering the purchase of a plant and I knew that in one case I would have to face a certain expenditure for removing, and another case it would be very remote, I would be willing, I presume, to pay something more in a condition where the possibility of the expense was very remote.

Q. That is to say, even though the reproduction cost of a gas main that was located, we will say, in the center of Market street, and that gas main in its new location at one side of Market street would be exactly the same, yet, if you were considering the purchase of this property as a whole, you would consider that the distribution system was somewhat more valuable if the main had been changed to a location where the probability of its being to be removed to another

location would be much less than if it had remained in the other position.

A. I would consider that I could probably afford to pay more for the property if I did not have to meet a large expense for removal.

Q. If the reproduction cost is the same, why is it that you would make this difference, considering yourself now in the position of purchaser or seller in the value of that distribution system, when
643 the distribution system has been so located that the probability of removal is diminished?

A. Why would I pay more?

Q. Yes, why would you think the distribution system worth more when so placed that there was less probability of any part of it having to be changed from its present location?

A. I would be willing to pay more probably in view of the fact that I would not have to make a very large expense—I mean as a comparison between the two, if on the one hand I had a situation where I had to purchase a pipeline that would involve an expenditure in the very near future of say \$10,000, for a change, and I could buy a pipe line serving the same function on which the expense of removal would be extremely remote, I would pay more in the latter case than the former.

The Master: Although the \$10,000 would be allowed to you in any rate-fixing adjustment as a part of your operating expense?

A. Yes, I think I would in any event pay more under the conditions as a purely business proposition.

Mr. Bosley:

Q. The prospect of your being able to get back in rates the extra expenditure of \$10,000 you would not consider a certainty, I suppose, even if the rate-fixing board should be perfectly willing to grant an increase sufficient to enable you to get it back, you still would have to deal with the consumers.

A. I would consider this—I am speaking purely as a business proposition—that a margin of that character in operating expenses would probably not be reflected in any rate; in other words, the rates,
of course, are not cut to such fine conditions that you take on
644 all small amounts; the rate would probably remain constant and if I had spent \$10,000 in operating expenses, I would not have to revise the rates to take care of that.

Q. You would have that much left if it were allowed to you in the rates in the long run, it takes you a little time in your adjustment and the net profits in the immediate future available for the payment of dividends would be somewhat less?

A. Yes.

Q. I take it that the different facts in connection with the plant which might increase your operation expense without proportionately increasing your sales and your revenues, would make a difference in your estimate of the value of the plant?

A. As a purchaser, you mean?

Q. Yes.

A. Yes.

Q. But it would not affect your estimate of the reproduction cost of the plant?

A. No.

Q. Then I take it you are sufficiently practical so that you would be subject to the influence of the prospect of net returns on your investment?

A. I mean that would be one of the governing features, sure.

Q. No matter what the reproduction value was, if the net returns were not such as to be attractive to you, you would not make the investment?

A. No.

Q. Now, is it not true, Mr. Ellis, that the value of any existing plant may change and change materially from year to year and from period to period even though the physical condition of the
645 plant remains the same and even though there is no obsolescence or inadequacy, or any other functional depreciation simply as a result, now, of changes in financial conditions?

A. Do you mean value of the plants for sale?

Q. Yes.

A. Yes.

Q. That is true, is it not?

A. Yes.

Q. A period of high interest rates on capital generally will be reflected in the selling price of properties of public utilities, will it not?

A. I should imagine so, yes.

Q. Assuming now that the earnings and the relation of earnings to the cost remains substantially the same throughout the period.

A. I should think that would be a reasonable assumption.

Q. If men can get 8% by investing their money in some other enterprise with equal safety, they are not likely to invest in public utility properties on a 6% basis, are they?

A. No.

Q. Now, then, a purely financial condition may affect the value of the property, may result in a depreciation, if you wish to call it so, in one way, or it may result in an appreciation in the other way, may it not?

A. Yes.

Q. At a period when money is plentiful and interest rates are low, you would probably find the sale value of the securities of public utilities and sale value of public utilities themselves, that is, of the physical properties, going higher, wouldn't you?

A. Yes; there would be a fluctuation in the securities,
646 naturally, depending on financial conditions, the market.

Q. Let us assume that the financial conditions were fairly stable, and the physical condition of your plant is fairly stable, that is, with the ordinary maintenance and repairs made from year to year, the physical condition of the plant does not change substantially, and there is no obsolescence, no inadequacy. Now, let us assume that there is a change in labor conditions, the cost of labor, we will say, is higher, due to some temporary cause or the cost of the

raw material that you use in manufacturing your gas changes; those changes will also be reflected in the market value of the securities of the owner of public utility properties, will they not?

A. I should imagine they would have some effect.

Q. An increase in the cost of labor would end to diminish the amount of net revenue?

A. Yes.

Q. Other things being equal?

A. Other things being equal.

Q. An increase in the cost of the material that he was manufacturing the gas with would have the same result?

A. Would have the same result.

Q. And increased production of oil, if that was the raw material that was used in manufacturing gas, naturally would result in a lowering of the price and increased net revenue?

A. Yes.

Q. For the gas company?

A. Yes.

647 Mr. Dailey: Are you assuming a stationary rate all the time, or are you taking into consideration a fluctuating rate of return?

The Witness: This is everything else being equal.

Mr. Bosley: Everything else being equal.

The Master: It would be a stationary rate, of course.

Mr. Bosley: Yes.

Q. Now, if the demand of the consumers for gas remained of the same character, they wanted to use it for the same purposes, and their product in the manufacture of which they use gas as fuel remained about the same, and if they were paying just about all they thought the gas was worth, any attempt to raise rates to meet these conditions would be very likely to result in a diminution of gross revenue, would it not?

A. It would be liable to.

Q. Well, then, if these changes in financial conditions or changes in economic and industrial conditions might affect the value of the public utility property, and if that effect is to diminish the net revenue, then the result is a diminution of the market value, that is, the sale value of the property, is it not?

A. I should imagine that would be ultimately the fact.

Q. That involves a depreciation, in a certain sense of the term, does it not?

A. It involves a depreciation, but not as we ordinarily mean it.

Q. Decrease in value?

A. Yes.

648 Q. It is a decrease in value. It does not mean a decrease in service efficiency, but it does not mean a decrease in value as used in terms of money?

A. Yes.

Q. Then, if we have a diminution in value or depreciation, which is only diminution in value as a result of obsolescence, as a result of inadequacy, as a result of physical deterioration, as a result of a

change of financial conditions, or the result of a change in economic conditions.

The Master: And the rates remain the same?

Mr. Bosley: Assuming that the rates are not changed proportionately. The rates may have even varied, but if they do not change sufficiently to meet the difference, you will find a difference in your net revenue.

Q. What is it, after all, that finally determines the value of your property in terms of money, the public utility property?

A. What determines its value?

Q. Yes.

A. Do you mean the sale value?

Q. Yes.

A. Well, the sale value I should imagine would be determined by the net return.

Q. The net return for the present and as estimated for the future?

A. Yes.

Q. I do not think that there can be any doubt about that. And aside from the regulating bodies, is it not true that the price of the product of a public utility will be determined by the operation of the law of supply and demand?

A. Ignoring the regulating body, you say?

Q. Yes.

A. If there were not any regulating body that would be true.

649 Q. I am assuming, too, that the public utility does not take advantage of any monopolistic situation.

A. I suppose it would be a proposition of what the traffic would bear.

Q. Now then if, as you mentioned a little while ago, the cost that may be incurred by a public utility in making changes in its property in order to adapt its property to other public uses in the streets, we will say, or to adopt the location of its own structures on its own land to the construction of additional structures which may be required in the conduct of its business, those expenditures really represent a cost incident to operation, do they not?

A. Yes.

Q. They will affect the possible and the actual net revenues, and so affect the value of the property as a whole in the ordinary sense of the term "value"?

A. They might, that is, if they were of sufficient magnitude.

Q. In the case of extensive alterations and changes in the distribution system rendered necessary by the changed conditions in the use of the public highways, would you think it proper to charge the entire cost of those changes against the revenues for a particular year, that is, as the operating expenses of that year, or do you think it ought to be distributed over some period of time?

A. Why, if it were an expense of such a magnitude that it would upset net return, or upset rates, I should imagine that it would be better to amortize it over some period, if it was some extraordinary non-recurrent expense of a large magnitude.

Q. Suppose, for instance, the rates were fixed at the beginning of a certain fiscal year sufficient to afford a reasonable return on the value of the property, used in this particular instance, under ordinary conditions, and assume that during that fiscal year changes in connection with street improvement were ordered of such a magnitude that the result of the pavement of those extraordinary charges in that year out of the revenue of that year would leave no return to the owner of the public utility property for the use of his capital, how do you think that cost should be treated?

A. In such an extraordinary contingency as that, I should think that they would immediately have recourse to the rate-fixing body to help them; in other words, if they had such a heavy expense that was not of their own initiative, they would be surely entitled to recover the money through rates; whether it would be more equitable to spread it over a small period at high rates or whether the rate-fixing body should see fit to spread it over a longer period, that would be a question of policy.

Q. Let us add another element to that. Suppose the rates had already been fixed for that year on a basis of yielding the largest net return. In other words, suppose the rates had been fixed and had been so adapted to the existing economic and financial conditions that they approached the normal cost of production, and were at the point where the demand would be at the highest, and where the entire sale of the product therefore would be the greatest, and where the actual net profit of the owner of the public utility would be greater than it would be at any other point, any increase in the rates then would not afford the public utility any relief, would it?

A. I don't know that I quite follow you. Do you mean if the rates had reached a point that you could not increase them without diminishing your return?

Q. Yes, without diminishing the return.

A. Yes, any changes in the rates, of course, would result in no benefit to the company—I mean if the increase were then offset by loss of business.

Q. Theoretically, the rates ought to approximate one where you will get the largest use on the part of the consumers and the largest net return to the owner, don't you think?

A. Yes.

Mr. Searls: From the point of the owner, at least.

Mr. Bosley: Let us assume that the rate-fixing body happened to strike that happy medium then where the consumers are getting the utmost benefit out of the service and the producer is getting the largest net return, the increase or reduction of rates does not result in any advantage, or does not relieve the situation, and you have here this very large expenditure which has been incurred, how are you going to take care of it?

A. It is unfortunate if there is no way of taking care of it.

The Master: You would go to Mr. Bosley for advice.

A. I think you are facing a somewhat similar situation on a claim of the company in Northern California now, where the gas rates are

presumed to be at the most productive point, but oil has gone up and it is a question as to how much they ought to increase the
 652 gas rates without reducing the business, and that is a matter that is engaging the attention of a great number of people; just what the solution will be, I don't know.

Mr. Bosley:

Q. Let me introduce one other factor into our problem here, Mr. Ellis. Suppose, as a result of these expenditures which were made necessary the efficiency of your manufacturing plant and distribution system were increased so that the result would be a diminution in the cost of production and distribution: Would you think it fair and proper that the owner should be allowed to keep the rates where they were and retain this additional saving effected by this increased efficiency until he had been fully reimbursed or compensated for this extraordinary expenditure including interest on unamortized balances, or would you cut down his rates?

A. I don't know. If he had no chance to recover through any other means this extraordinary expenditure, and there was a possibility of certain economies wiping that out in time, I think as a matter of equity if I were sitting on a rate-fixing body I would permit him to at least break even on his expenditure; that is what I would do.

Q. I think you would, Mr. Ellis. Now, Mr. Ellis, that is the sum and substance of the entire theory that I have presented in this case with reference to the treatment of obsolescence, and you have given your acquiescence to the principle for which I have been contending throughout this case. If you will read over the testimony that
 653 you have given this morning, you will find that to be the fact.

A. I am not familiar with your theory, but if you say so—

Q. (Intg.) I am making the statement so you may read over your testimony and you will find the result which you have finally reached. Now, Mr. Ellis, there is, I think, one other point only which I desire in connection with your testimony to cross-examine you on, and that is as to your general theory for providing for depreciation. Supposing, according to your theory of estimating allowances to be made for the purposes of providing for the making of all replacements rendered necessary by depreciation, whether functional or otherwise, you find after some period of time when you come to make your replacements that the cost per unit of the material required or of the labor required for making the replacements has substantially increased or diminished. How are you going to meet that situation?

A. Well, if there are fluctuations in either labor or material, your depreciation provisions from year to year would have to be altered accordingly; I mean if you had made provisions specifically to replace certain pipes or say a certain holder and you discovered a little later that your provision is going to be inadequate to replace that, due to increase in materials or labor, it should be corrected.

The Master: Obviously, for the purpose of your calculation, you

have had to assume that replacement cost and reproduction cost are equal?

A. Absolutely; it would have been a useless thing to attempt to do anything else.

654 Mr. Bosley:

Q. But if you attempt to make provision for it you have got to take into consideration the fact that prices from time to time will probably vary from the prices on the basis of which you have estimated the reproduction cost. That is a fact, is it not?

A. Yes; in our estimates we ordinarily assume a range of years as being represented; if a thing should differ materially in other years, why some further provision should be made.

Q. Let us suppose, for instance, a case where a depreciation reserve has been computed and has been allowed for the last 15 years prior to July 1, 1916, on the basis of reproduction cost prevailing during that period, and suppose at the time you had to make the replacements you had fallen upon a period of such prices as have prevailed during the current year; your allowance would be insufficient, wouldn't it?

A. For any replacements that had to be made during this year?

Q. Yes.

A. If it had been built up on a lower rate of course, and a certain property were being replaced this year at a much higher price, our allowance would be insufficient.

Q. Suppose, further, you had separated your physical deterioration and the depreciation consequent thereon from the depreciation due to obsolescence; supposing you had taken care of your depreciation charges due to deterioration by replacements year by year and had applied that portion of your reserve every year so that every year you had replaced all the physical, deteriorated parts and had kept

655 the plant as near to 100% physical condition as it was possible to do it, and suppose you had simply accumulated a reserve for the contingency of obsolescence, and then the obsolescence happened to fall upon a time when the cost of replacement would be exceedingly high, as in this present year 1917, obviously there would be some injustice to the owner of the public utility, would there not?

A. Do you mean if he had not accumulated sufficient to replace it?

Q. Yes, on the assumption he would not have accumulated it if he had made his accumulation on the basis of an estimate made from 1900 down to 1914 or 1915.

A. That is exactly parallel, is it not, to the case I cited before: If provision had been made for depreciation that is not sufficient at the time of replacement, why, the owner suffers to that extent.

Q. If you take it the other way around, suppose the obsolescence reserve had been computed on the basis of 1917 costs.

A. An obsolescence reserve?

Q. Yes, and then when the obsolescence actually occurred the prices were back at a level corresponding to the prices, we will say, of 1900, then the owner of the property would have a large balance left over, would he not?

A. What do you mean by the obsolescence reserve, Mr. Bosley? Do you mean if you had differentiated between a reserve for physical depreciation—

Q. And the reserve for functional depreciation.

A. If you were to replace anything that has died from obsolescence and you have not sufficient money?

656 A. I am assuming the reverse of that, that the obsolescence reserve has been accumulated on the basis of 1917 prices of labor and materials and at the time the obsolescence occurs the prices of labor and material are back where they were in 1900. In that case the reserve would be excessive, would it?

A. Yes.

Q. And the consumers would have suffered?

A. Yes.

Q. From having to pay a higher rate than necessary?

A. Yes.

Q. Now, suppose we reverse that process with reference to our obsolescence, and suppose you charge the cost of replacements to obsolescence, not to the past consumers, but charge it against the saving to be effected by the use of the new process, do you do any injustice there either to the consumers or to the owner of the property?

A. I think that it is one method of handling it. I do not think it is as equitable personally as the method I used.

Q. In what possible way could it operate unjustly to either the consumer or owner? Take the case of the owner in the first place: Would he be in the position to charge any more than the actual amount of the obsolescence in his rates? The amount of his obsolescence is determined when the obsolescence occurs, is it not?

A. Not necessarily. It can be anticipated. Obsolescence can always be anticipated.

The Court: The amount is determined at that time, when the replacement occurs?

A. The amount, yes.

Mr. Bosley:

Q. The amount is determined. If the result of the substitution of the new is to diminish the cost so that the product can be
657 furnished without the increase of rates, the new invention justifies itself and takes care of the obsolescence in the exact amount, does it not?

A. Yes.

Q. You can't see any injustice in that, can you?

A. No.

Q. Neither can I. I think there is no further cross-examination, except that I would like to have you answer that question.

A. Yes.

The Master: I want to ask a few questions, which, now that the cross-examination is closed, ought to come now. It is possible that Mr. Ellis has already covered what I have in mind in his direct examination. I had in mind the distribution system and the prob-

able lives that you use there, Mr. Ellis. I think that is in Exhibit 93, page 29.

A. Yes, Exhibit 93, page 29.

Q. That shows starting with the largest ones, 100 years probable life for the 20 to 30 inch; 60 years for the 10 to 18 inch; 40 years for the 6 to 8 inch; 35 years for the 4-inch and 25 years for the 3-inch. Is that right?

A. Yes.

Q. Now, taking that largest size, 100 years is almost indefinite life, is it not, for almost all practical purposes?

A. Yes.

Q. That is to say, the inference that you have given to a determination of the life there, has been for the first year 1913, you have given a contribution to annual allowance of \$392?

A. Yes.

Q. And you have reduced the value of the plant in that particular about \$4,000?

A. Yes, the aggregate reduction.

Q. Well, you could not give any particular reason why you
658 should not have made that life 150 years?

A. No.

Q. Or 75 years?

A. No. On several items there was practically unlimited life, to all intents and purposes. I think the same thing applies to a tunnel that is over here at the Potrero; we simply fixed 100 years; we might just as well have said 200 years, although we hated to predicate anything on further than 100 years.

Q. Then you would not have been very much in error if you had not assigned any life cycle to it at all?

A. No.

Q. And attended to it entirely on the replacement method?

A. Yes.

Q. In other words in that there is no account given of functional depreciation that you can identify?

A. No.

Q. Now, when you get down to the next range of sizes, from 10 to 8 inches, where you adopt 60 years, the influence of your life period is a little more apparent; there on a capital valuation new, which is the assumed replacement figure, you have \$690,000 in rough figures and you have taken off \$32,000?

A. Yes, in 1913.

Q. And your contribution to the reserve is \$3,500?

A. Yes.

Q. Well, now, how did you determine your life of 60 years there. Is there any obsolescence feature in it? I say obsolescence and distinguish it from inadequacy.

A. No.

Q. I do not suppose pipe becomes obsolete at all, does it?

A. Pipe does not become obsolete; in other words, a pipe carrying gas probably would be pipe as long as gas is distributed.

659 Q. So that as I would view the problem in cast iron the figure that would determine life would be under the heading of all classes of depreciation other than physical and obsolescence.

A. Yes.

Q. There is practically no physical deterioration, is there, that you know about?

A. Not materially, in the large range of these pipes; there may be a little in the three-inch, but not to affect this study.

Mr. Searls: There might be in cases where the pipe was merely a part of the auxiliaries of structures which would go out on account of obsolescence.

The Master: That principle goes all through. You might have a piece of equipment here which would last forever as against any of the forces of depreciation, but it would go out of value if the main structure to which it was auxiliary went out.

Q. Then you make a difference of 40 years on the theory that the distribution of pipe line and other surface conditions is going to operate to bring that pipe to the end of its life?

A. Yes, from the consideration, your Honor, that numerous sections of pipe within this range had gone on out of existence, was dead.

Q. So that you get that figure as an approximation from the past history of ten to eighteen inch pipes of this company?

A. Yes, as far as we had information available. The determination of the lives of cast iron from 60 down to the 25 years, of course at the best is more or less of an arbitrary determination, the
660 data not being very voluminous.

Q. But you feel satisfied that it should not be given an 100-year life?

A. Yes, there is a distinction there; if it were separate, say 16-inch and 18-inch, it might be that the 16-inch and 18-inch might more properly have, say, a 75-year life, and the 10-inch a 50-year life, but we threw them into more or less arbitrary groups.

Q. Well, all of these, then, down to the four-inch, at least, are given periods of life expectancy on the theory that service conditions will require them to be taken up?

A. Yes.

Q. And the loss in such case is largely a loss in labor, is it not, and materials that are incident to pipe laying, other than the pipe itself? The pipe itself can be used over again?

A. It ordinarily does not pay to take out a pipe say under ten inches in diameter, on account of the paved condition of the street—I think about ten inches, is it not, Mr. Jones?

Mr. Jones: Yes.

Mr. Bosley: I suppose if you found it necessary to relay a larger pipe and you happened to lay that in the same location, so that the excavation would serve for removing the old pipe and laying the new pipe there would be an advantage in taking the old pipe out?

A. Yes, if you can remove the old pipe without extra expense,

as was done by the company, you could recover it—they take it to the pipe yard.

The Master:

Q. Did you find, in the company's history, quite clear indication —I do not mean definite indication, but fairly clear indication that justified you in finding the life periods for these
661 very classes of pipes?

A. Yes, fairly so; on the larger sizes, as from the 6 inch up to the 18 inch, there was not so very much definite data; in other words, we had all the recent orders of changes and removals of that type of pipe and also the list of dead pipe; but on the four-inch pipe we had considerable more information, and we were able to determine that figure of 35 years—although it might range 30 years or it might range 40 years—I believe my original estimate was a little higher and the company's a little lower, and that was more of a compromise figure.

Q. That is the largest item in the distribution system, is it not?

A. Yes.

Q. The 4 inch cast iron?

A. Yes.

Q. There the effect of your method of depreciation has been to cut off from the reproduction value about \$240,000: Is that right?

A. Yes.

Q. Now, the depreciation that takes place by virtue of consideration of obsolescence, I should imagine would occur chiefly in the manufacturing part of the plant?

A. Yes, almost entirely. In my study of depreciation, I think I show a table showing relatively the percentage of capital in each main group, such as generating station, services, meters, pipes and
so on.

Mr. Bosley: That appears in Exhibit No. 92, Mr. Ellis.

A. Yes, and as I recall it the distributing capital itself, which is the mains, services and meters, aggregates somewhere in the neighborhood of 75 per cent of the total capital, and on the two
662 elements of mains and services it is not a question of obsolescence at all, with the pipe; on the question of meters, the obsolescence has not entered so far, to any great extent; in other words the new type of meter was being substituted as the old ones died; the only elements, really, where obsolescence has been very material has been in the gas generators themselves. Take one big element, for instance, which are the holders in the stations; the holders do not obsolesce. Of course, there are improvements in types of construction, but the holders, that is, a million-foot holder, whether it is a combination of brick and steel or wholly a steel holder, it has a capacity for a million feet of gas, and additions are usually made by adding additional units. In the question of buildings, of course, one of the determining elements there is the question in inadequacy, not obsolescence. Obsolescence has been largely confined, as I say, to the generating apparatus.

Mr. Bosley: As to that you have been guided largely, as I understand you, by the company's own charges of estimated future progress?

A. Yes. I base it on a number of matters, particularly on generating stations, and taking the generators themselves with their auxiliaries. We took, primarily, a study prepared by the company as to development and probable changes, and accepted that as a starting point, and then we developed our figures from that. We knew the date of installation, and we took the company figures on the probable dates of supersession.

663 Redirect examination.

Mr. Searls:

Q. Mr. Ellis, Mr. Bosley has dwelt at some length upon the equity of allowing the consumer in the future generations to take care of the obsolescence which resulted in the past generations of gas plants, speaking generally, because of the saving which resulted from the installation of new apparatus in the course of the change of the art which in time will enable him to get lower rates. I want to ask you what your study of the actual situation in San Francisco shows with respect to the advisability of letting each generation of consumers take care of its own problems?

A. I think, specifically referring to the present date, while there have been improved Jones generators put in, cutting the operating expenses somewhat, at the same time the consumer has to stand the burden of the increased cost of oil and labor, so in the aggregate, so while the increase in labor and material is not the fault of the company, so far as the consumer is concerned it is not an unmixed blessing for him—certain changes in the art. There may be some other element that is fully compensated in the cost. As I say, that is the case today in San Francisco.

Q. In other words, merely because there is a change in the art which results in the saving of operating expenses, it does not mean that the consumer at the present is going to eventually get lower rates?

A. No, as a case in point, there were times here shortly after the installation of the improved Jones process when there were economies effected in the cost of manufacturing, but the unaccounted
664 for gas had gone up so high that it helped to offset—I mean if you take the resulting cost between the generating and the cost delivered, the increase in unaccounted for gas had pushed the price on up, partially compensating for the economies in manufacture. It is not an unmixed blessing. There are various elements entering into it.

Q. If you have that complex situation so that you cannot say definitely what the effect of any single factor in the gas business is going to be, considering the proposition as a whole, do you think that one factor would justify you in taking from the shoulders of the consumers who are enjoying the gas service today the duty of

providing for the obsolescence on that plant, and say "We will take care of that at some future date out of the pockets of the future generations of consumers?"

A. No. My personal opinion is that the present amortization should stand on the present consumers.

Q. Now, let us take again the particular case of the company that we are dealing with here, and its predecessors in interest: From your study of the history of the gas business in San Francisco, did you find anything which would lead you to believe that the changes from one process to another were changes that occurred ever night, as it were, and which the company could not have provided for by the exercise of reasonable diligence in setting aside reasonable reserves?

A. No; the introduction of water gas into coal gas plants was a gradual affair; water gas sets were installed in a small way a number of years before plants finally grew up entirely to be
665 water gas plants. As to oil gas manufacture, from such as I have read and heard on the subject, the manufacture of oil gas was commercially demonstrated in Southern California, according to the testimony of Professor Lowe in 1887, and was installed in Northern California before 1900, so the company must have been cognizant of the fact that it was coming as an improvement years before it was installed by them.

Q. Do you find anything in the history of the depreciation reserves which were accumulated by 1905 which might indicate to you that that very factor might have been in the mind of the managers of the company at the time these reserves were set up?

A. Well, I don't know that there was anything specific—reserves were set up for about three years prior to 1905—they accumulated to quite a large amount and then were written off to surplus. Prior to the writing off to surplus, however, from the book figures, it seems that a large sum of money was charged against these depreciation reserves, apparently for the amortization of certain property, although there are no specific details.

Q. Were these sums which were annually set aside large enough so as to lead you to infer that something more than merely physical depreciation may have been in the minds of the managers of the company?

A. Oh, absolutely.

Q. Now, take the situation in 1911. The exhibits here in evidence show that \$2,100,000 has been accumulated in the San
666 Francisco Gas & Electric Company's gas department depreciation reserves by that date, I believe?

A. Somewhere in the neighborhood of \$2,000,000.

Q. We find from Exhibit 58, Sheet 16-a, that the total amount of obsolescence which Mr. Bridges says existed in the gas department in 1905 was \$2,723,000, which included all of the North Beach obsolescence, Potrero and P. G. I. and Equitable obsolescence, as he terms it. If that reserve had not been written off into surplus, even assuming Mr. Bridges' definition to be a correct definition of

obsolescence here, they could have taken care of all but about \$600,000 of that early obsolescence by 1911, couldn't they?

A. It would appear that way; they had a reserve; I don't know just why it was transferred into surplus.

Q. On cross-examination you were asked about the proper treatment of the removal of mains or other apparatus which had been installed under the direction of public authority, or by reason of public improvements. In your study of depreciation reserve, did you take care of this factor of probable removal of certain types of apparatus and make provision for it in your annual allowance?

A. You mean under order of the municipality, or under extraordinary conditions?

Q. Not under extraordinary conditions, but as a result of the growth of public improvements in general?

A. I don't know as I considered that specifically, except as it might have been reflected in the dead mains and so on that were used in our study of probable lives; in other words, if the
667 company had been ordered to change its mains to another side of the street, or to install mains on another side of the street, for some reason or other, and had left an old main in the ground, to the extent that that might have entered into the calculation specifically, we did not attempt to provide for just that contingency.

Q. To the extent that it did enter into the calculation, some provision is included in your depreciation allowance for just that type of removal, so that it is not a thing that would have to be suddenly and unexpectedly met out of your operating expenses for a given year?

A. To the extent, as I say, that that condition might have been one that affected certain abandoned mains that appeared in our study, to that extent it was reflected, although we did not specifically consider it.

Q. Now, I understood you to say that where an expense like that arose suddenly and unexpectedly, it was good policy to take care of it in operating expense for the given year?

A. Yes, I believe that is the method of handling it.

Q. And, obviously, if the public authorities should put the company to such an expense in that matter that it could not be met out of the operating expenses for a given year, either the rates should be increased or the expense should be amortized over several years?

A. Yes.

Q. Counsel directed your attention to the fact that the value of the plant for sale purposes might fluctuate considerably, as the net return was affected by the variation in earnings or
668 operating expenses. So far as the net return is determined by revenue that, of course, is dependent upon the rates in question?

A. Yes.

Mr. Bosley: You mean the rates alone, or do you mean the rates and quantity taken by the consumer and furnished by the company?

Mr. Searls: I accept your correction: By the rates and quantity of gas sold?

A. Yes.

Q. Where the rates are fixed by public authority and not by free economic conditions, it is common practice to base the rates on the value of the property, is it not?

A. Yes.

Q. So that if you attempt to determine the value by the rate and the rate by the value, you would get into an illogical circle?

A. Yes.

Q. You have got to differentiate one from the other?

A. Yes.

Q. Independently of the effect of return on value?

A. Yes.

Q. Now if you have what counsel terms free economic conditions and a monopoly control of the product at the same time, you are very apt to have a set of conditions in dealing with a practical necessity, or at least one of the necessities of life, where the monopoly would be able to operate the law of diminishing return to the point that there would be a place where you were dealing with a luxury or some commodity that was not affected by the human necessity for its use, would you not? Let us take a simple case: Let us take the case of water: There is practically no limit to which the consumer would pay rather than go without water.

A. Yes.

669 Q. Of course, gas has some competitors in domestic consumption, at least, and in industrial consumption certainly; but there is the personal equation there in the use of a commodity to which the community is accustomed, is there not?

A. Yes.

Q. To the extent that that enters into the calculation, the operation of the law of diminishing returns, as the economists call it, would be disturbed?

A. Probably.

Q. Counsel has suggested that sometimes the abandonment of a certain type of apparatus and the adoption of another type becomes necessary, not alone by reason of changes in the art, but by reason of economic changes in the price of fuel or other basic materials used in the operation of the plant. If that is the case and the company finds that it is less economical to use a plant which uses coal as the basic material and more economical to adopt one which uses oil, we will say, does there seem to be any sound reason why the company should be entitled to the entire benefit of the reduction in cost as against the consumer? In other words, the company has nothing to do with the reduction in the price of the material in the market?

A. No. You mean specifically, taking the case of oil coming on in large quantities and at a very low price, to the extent that the oil afforded a saving, that the consumer should participate in the saving?

Q. Yes.

A. I think it would be equitable that he have some participation in it.

Q. In other words, we might have had Mr. Jones' oil gas process invented just as he has it today, and if the price of
670 oil had not come down below the point at which it was in 1900 and prior thereto, it is altogether probable that the company might still be making some other kind of gas?

A. If other materials had not gone up also to force them to the oil.

Q. Well, even if the materials had gone up but had retained the same relation to the price of oil that then existed, it is possible that the oil gas manufacture would never have come in?

A. Not if oil had been so high as to not warrant a change.

Q. Do you know what the facts were with respect to that?

A. As to the point of equivalency between the coal and oil, I don't recall just at the moment when the change was economically possible.

Q. I understood counsel also to suggest that a coal gas plant might be up to date and perfectly as valuable for making a coal gas as it ever was, and using modern improved processes, and yet by reason of the increase of the price of coal and a reduction in the price of oil, it became absolutely useless, so far as a certain community or district is concerned. Do you think it would make any difference in the market price which a purchaser would pay for such a plant, assuming that it could not be removed to a district where coal gas could be even economically manufactured, whether the obsolescence, I prefer to call it, was caused by new invention, or by economic changes of the type which I have just mentioned?

A. Do you mean whether it would make any difference to the purchaser as to how the obsolescence had occurred, assuming
671 that it had occurred?

Q. Yes.

A. I don't think it would concern the purchaser if there was a plant that was obsolete—I would presume that the purchaser would not pay for it, that he would not care how it had occurred; I can't say how it would affect his conclusion.

Q. In other words, the location of a plant might have as much to do with its obsolescence as its operating condition?

A. Yes.

Q. And the type of its construction?

A. Yes.

Q. I understood you to testify on your direct examination—I don't think the inference has been changed by cross-examination—that in determining your probable lives you did take into account the scrap or residual value which the structures in question would have?

A. Wherever we deemed that it was of sufficient magnitude to consider, we did; over a large range of the structures the scrap value would be nil; in other words, in some cases the scrap would be a liability rather than an asset; but wherever it amounted to sufficient to consider, we considered it.

Q. If you had certain accessory equipment to a water gas plant which was useful in connection with the operation of an oil gas plant, could be transferred, was the residual value it would have taken into account under your assumption?

A. Yes, specifically, there was considerable auxiliary machinery that went with certain sets that will probably be abandoned, and they were considered in the light of the fact that they were
672 not obsolescent machinery, but would be transferred to the company's smaller plants throughout the state, as is customary with that type of apparatus.

The Master: You gave it a longer life in that case?

A. Yes; presuming there was an exhaustor, say, if it remained in its present position, that we would ascribe a life of 25 years to, and that the set to which it belonged died in 15 years, we would consider that that exhaustor would have a useful value elsewhere, and while there would be a loss due to its foundation and things of that kind, we gave it a probable life of 20 or 25 years.

Mr. Searls:

Q. Counsel devoted some time yesterday to cross-examination on the subject of going concern allowance. I think in most of his hypotheses he assumed that rates were based on just enough to pay return on a plant with a maximum condition of development, so that there would be no room for a marginal excess over the normal return to take care of new investment where it was made necessary. Will you state from your observation what the practice of the rate-fixing body has been with respect to additions and betterments which are made from year to year? Has it been to wait until the year is over and then include those in the appraisal, or to include them at the beginning of the year?

A. They usually take them into consideration under two captions, construction work in progress and estimated construction expenditures, for the ensuing period.

Q. You acted as advisor to the board of supervisors during
673 all of the years in question, didn't you—engineer advisor?

A. Yes, during two of the years, I think—one or two of the years.

Q. Do you know whether the practice then was to include in your report to them the estimated improvements for the succeeding year, or to leave them out?

A. No, I believe those were included, as I recall now—the estimate was included; it has been some years ago.

Q. With respect to the inventory and appraisalment in this particular case, the question of additions and betterments has been taken into account in each year for the years during which the rates were in effect?

A. Yes.

Q. That is, additions and betterments made during the fiscal year 1913-14 are included in the rating base for that year?

A. Yes, they are reflected in the average; in other words, the value was taken as of June 30, 1913 and as of June 30, 1914, including the additions for the year, and an average was taken between the two, so it really reflects the average of additions and betterments for the year.

Q. In your examination of the past history of this company have you found that where additions and betterments were made they were, as a rule, of such magnitude as to materially disturb the net revenue which would result from the deduction, we will say, of the bond interest necessary to be paid?

A. Not in the gas department, from such a study as I made.

Q. The additions and betterments are usually relatively small compared with the total investment of the company on which
674 it is earning a return?

A. The investment in additions and betterments has been running along fairly normal. I have not the exact figures here, but they are in evidence.

Q. I suppose the new generator sets constituted the largest departure from the normal run of additions and betterments?

A. The new generating sets were the largest individual elements, although their construction was spread over quite a period.

Q. In the past history of the company, where the company and its predecessors have acquired entire plants, such as North Beach plant, or the P. G. & E., they also took over consumers which were attached to those plants, did they?

A. Yes.

Q. So it was not a question of building up a business on those plants, without new consumers already attached?

A. No; they took over the distributing system, naturally, and the mains and services and meters.

Q. Did you find anything in your study of the history of the gas company which would lead you to believe that the proper theory to consider in this case is one of original deficit not offset by subsequent excesses from the normal return?

A. I don't know that I quite grasp that question.

Q. The question is not clear; I will reframe it. Do you find anything in the history of the gas company which would lead you to believe that there have been large new investments of such a magnitude that they would disturb the normal return to the stockholders of the company after the concern was once started, so that
675 it would upset the theory which you originally advanced that the only deficits to be allowed would be those which existed when the plant was originally started and were not offset by later excesses over normal return?

A. I found no such condition so far as my examination went.

676 Further redirect examination:

Mr. Searls: There was a question I wanted to ask Mr. Ellis about, as to which Mr. Jones testified, relative to the six-inch pipe, in the depreciation.

A. In reading over Mr. Jones' testimony, on the age of and possible life of cast iron pipe, I was not present when he was testifying that afternoon, and as he stated, and as you called his attention to it, he did not sit in with Mr. Vincent and myself on the determination of those ages, for the reason that as far as we were concerned—we would have been very glad to have had Mr. Jones sit in, but it was a question of determining facts from a scrutiny of an immense amount of detail data. We had all this compiled, as far as that was possible, that is, the company had it compiled, largely through their distribution department, Mr. Kettleman's office, where these records are kept—I do not want to be misunderstood in this matter, that we had made arbitrary ages for 4 or 6-inch cast iron pipe without considering what had gone on out; Mr. Jones seemed to think, if I interpret his testimony right, that there was very little of it removed or abandoned. Now, just speaking of three or four years, on the main items of cast iron pipe, I happen to have in hand here the records of the company, compiled for me in 1912, 1913 and 1914, on 4-inch cast iron pipe during that period, and they replaced and abandoned 40,000 feet or practically 8 miles of it. On 3-inch cast iron pipe they replaced and abandoned about 677 about 22,000 feet. On 6-inch cast iron pipe they replaced and abandoned in the neighborhood of 4,000 feet. On 8-inch cast iron pipe they replaced and abandoned about 4,000 feet. On 12-inch cast iron pipe they replaced and abandoned about 2,200 feet; on 16-inch cast iron pipe they replaced and abandoned about 1,100 to 1,200 feet. In other words, showing possibly that Mr. Jones and I were talking from different standpoints, but I want to emphasize the fact that we examined all of the data that we could and found that there was 4-inch and 6-inch and 8-inch and 10-inch cast iron pipe going out of service constantly.

The Master: Let me ask you a question there: Are these lengths of pipe that you have recited lengths of pipe that would come under a replacement program, as distinguished from ordinary repairs?

A. Yes, absolutely.

Q. For instance, if there is a length of 6-inch cast iron pipe broken and taken up on Market Street here, would that be included in your mileage?

A. No, not as I understand the records. These records were compiled from others, for certain specific jobs of replacements and so on. Of course, ordinary repairs, and so on, are matter of routine on which they do not keep tab. I scrutinized a number of the larger job orders that enter into this affair, it would usually be a job of a character sufficient to warrant either an authorization from the general manager or an authorization from the head of the distribution department, to replace 600 feet of 4-inch cast iron pipe, in such and such a district, or to cut out a corresponding amount of some size of pipe at another point; there was no attempt, 678 of course, to compile, and I don't think the data is available to compile, the ordinary repair matters, which is purely a maintenance affair.

Mr. Bosley:

Q. Do you know in what part of the city those replacements took place?

A. Speaking from memory, there were replacements, of course, due to, in the first place, street railroad matters; there were replacements that were somewhat extensive—I am not sure whether they are in those years that I have got, or the subsequent year—I have not got 1915-16 details here, but Mr. Vincent and I looked those over in his office. But take, for instance, the repaving of Third Street, when the city was repaving Third Street, throughout its length, I believe there was quite a large amount of the small pipe taken up and a larger one put in its place, so as to avoid breaking the new pavement. I think there was considerable work of that character over some section on Sixth street, at the time that the city opened up the street, and I believe in the Noe Valley district, which is a district on out west of Dolores street and extending on out south to Twenty-second street and over that country over there that has become very heavily populated since the fire, where the South-of-Market-street crowd seemed to concentrate over there, I have noticed through that district quite a little replacement, as I recall it. I am stating all of this from memory.

Q. The result of your observation would be in substance that wherever there was any replacement of 4-inch main that had taken place it was in the more thickly and densely-populated districts?

A. I rather think so. I think that would follow. In other words, where a 4-inch has been replaced, it probably might have occurred from three or four causes, that on the opening of the pavement it is not an inopportune time to replace mains in more or less congested districts, or districts that promise congestion in the future, rather than burden the company with the expense of cutting the pavement or the city with the expense of having its pavement, new pavement, cut, which is always a bad feature.

Q. Do you know whether any of the replacements were what Mr. Jones called tie-in lines, or extra feeding lines?

A. That was not very material. Of course, the tie-in lines were not replacements. They were just exactly what their name signifies, they were tie-ins.

Q. New sections of pipe laid for that purpose?

A. If you had an old line coming in—of course, you had that happen after you acquired the Metropolitan, and the same thing happened when you took on the Independent—if the Metropolitan were coming down Polk street, say with a 6-inch line on one side, and the P. G. & E. had a 4-inch line on the other side, there were tie-ins put in so as to make a gridiron system.

The Master: Is that replacements or maintenance?

A. Tie-ins, I think, are carried as additions and betterments in the charges; they were absolutely in the category of additions and betterments; it was new pipe.

Mr. Searls:

Q. Do you recall finding any replacement of pipe which might have been due to actual, physical deterioration as distinguished from inadequacy?

A. I did not carry my study to that extent, that is, as far as distribution pipe was concerned,—to have an intimate familiarity with the little pieces of pipe that came out.

Q. Do the company's records show any distinction between pipe which is replaced by reason of inadequacy and pipe which is replaced because of deterioration?

A. Oh, no; as to pipe taken out, there is no specification on the work order, I mean as to just what cause contributed to its removal.

681 Mr. L. P. LOWE, called as a witness for the defendants, testified in substance as follows:

I am in my 58th year, I reside in San Francisco, and am a gas engineer.

By "gas engineer" I mean that I am versed and skilled in the erection of gas plants, including the installation of gas making machinery and gas distribution systems, in connection with which I have had forty years active and continuous experience.

As the title of gas engineer is a self-styled one, there being no generally accepted collegiate degree known as gas engineer, it may be well to state that to be recognized by one's fellows as a gas engineer, one must be versed in mechanical and civil engineering and architecture, in so far as those professions apply to gas engineering, and one must also be possessed of a comprehensive knowledge of physics and chemistry in so far as those sciences apply to the gas business.

It is also necessary that one should have had practical experience in the construction and operation of gas works of various kinds over a sufficient period to acquire a comprehensive and skilled command of the installation of gas making systems and the distribution of gas as customarily supplied in towns and cities.

682 In addition to the construction and operation of gas works, I have also been the owner and operator, wholly and in part, of gas properties, and as such I have been a student of the gas business from the viewpoint of economics.

My father, the late Prof. T. S. C. Lowe, well known on the Pacific Coast as the builder of Mount Lowe Railway in Southern California, was a scientist of note and the inventor and patentee of the Lowe Water Gas System, which ultimately came into world-wide fame and use, and is still one of the leading gas-making processes.

After a special course in mechanical engineering, which I took at Cornell University in 1876-77, I, in the fall of 1877, was placed by my father with the Lowe Manufacturing Company of Norristown, Pa., a concern organized by my father for the building and installation of gas making machinery and gas works apparatus and appliances in general, including the manufacture of a general line of gas

consuming appliances. While with the Lowe Manufacturing Co. I went through its various departments, including practical work in foundry, boiler shop, machine shop, pattern shop, sheet metal work, etc., after gaining proficiency in which I became one of the company's constructors and as such designed and installed many gas plants throughout the United States, some of which plants were built for others, and some of which were organized and installed complete by my father as personal ventures, in which I ultimately became interested. This latter work included not alone the construction and erection of gas making machinery, but also the installation of the gas distributing systems, and, in some instances, the operation of the plants.

As a result of negotiations between my father and certain capitalists, the United Gas Improvement Company of Philadelphia, Pa., was formed, which organization was based on the water gas patents of my father. This concern grew rapidly and ultimately became one of the largest and most powerful gas organizations in the world.

For a while the gas works installed by the United Gas Improvement Co. were built by us, by which I mean the Lowe Manufacturing Co., until, as a result of modified agreements, the United Gas Improvement Company instituted its own gas works erecting department, after which the operations of the Lowe Manufacturing Company were confined to the construction of gas works in certain reserved territory and to the operation of a number of gas plants in various sections of the country, in connection with which work my services were continuously employed, both in operative and managerial capacities, until 1889. Some time prior thereto, my father had moved from the East and established his residence in Southern California, where he had become engaged in the gas business in Los Angeles and Pasadena, I having meanwhile remained in the East, where I gradually disposed of our Eastern gas interests, the last one of which was at Lynn, Mass.

While in charge of our gas works at the latter place, I invented and patented a method of manufacturing gas from oil, this being the method of gas manufacture which has since come into such general use on the Pacific Coast and elsewhere.

After a brief visit to California in 1889, where I aided my father in the construction and operation of the gas works at Los Angeles and Pasadena, I went to Colorado Springs, Colorado, where I built and operated a gas works until the spring of 1894, at which time I disposed of that property and came to California, where I have since resided. For a few years after coming to California I aided my father in the building and completion of the Mount Lowe Railway, and I also had active management of the gas company at Pasadena.

During the time I resided in Pasadena I sought to interest gas companies on the Pacific Coast in my method of manufacturing gas from oil, in which efforts I gradually met with success in that I not alone built a great number of gas works for others, but also personally became interested in several gas properties.

Amongst the localities on the Pacific Coast and adjacent territory

in which I have built, owned and operated gas works, are:
685 Chico, Colton, Colusa, Eureka, Fresno, Gilroy, Grass Valley, Hollister, Long Beach, Los Angeles, Marysville, Modesto, Monterey, Napa, Oakland, Ocean Park, Palo Alto, Pomona, Red Bluff, Redding, Riverside, Redlands, Sacramento, Salinas, San Diego, San Francisco, San Rafael, Santa Barbara, Santa Clara, Santa Cruz, Santa Monica, Santa Rosa, Selma, Watsonville, Whittier and Woodland, in California; Reno and Tonopah, in Nevada; Beaumont in Texas; Prescott, Phoenix, Tombstone and Tucson, in Arizona; and Honolulu in the Hawaiian Islands.

While actively engaged in the construction of gas works in California, I conceived the idea of manufacturing gas on a large scale in the oil fields near Bakersfield and transmitting the gas through high pressure lines over a distance of more than 325 miles to supply San Francisco, Oakland, Sacramento, and San Jose, and the numerous towns along the route through which the contemplated pipe line was to pass. In this project I enlisted the aid of Mr. John Martin, as a result of which the California Gas & Electric Corporation was formed, in which I became one of the principal owners, and while the project of installing the plant at Bakersfield and the high pressure transmission line to the localities stated never materialized, because

of inability to finance the project, it resulted in the purchase
686 and consolidation, on a large scale, of numerous gas and electric properties in Northern and Central California, the finality of which was the organization of the Pacific Gas and Electric Company, a combination of the California Gas and Electric Corporation and the San Francisco Gas and Electric Company.

Since the expiration, a number of years ago, of my first gas making patents, many gas companies and others on the Pacific Coast and elsewhere, have erected apparatus for the manufacture of gas from oil, to which they have given various names, the basic principle of all of which is, however, that that I invented, as stated above.

The above is a brief resume of my forty years active connection with the gas business, with the general development of which I think I can fairly say I am entirely familiar.

As my recollection serves me, I have resided in San Francisco during the past eighteen years, and while I have never had any personal connection with the gas companies which have operated in San Francisco, save the San Francisco Coke and Gas Company, of which I was one of the organizers, I have, nevertheless, kept myself generally informed concerning the general progress and development of the gas business in San Francisco. The only companies
687 with which I have had active connection of late have been at Palo Alto, California, and in Tonopah, Nevada. The

California property has just passed from the ownership of the Palo Alto Gas Company to the municipality of Palo Alto. I built and operated that company for about thirteen years. I was the vice-president, general manager and treasurer of the company during all of that time. That company purchased gas at wholesale from the Pacific Gas and Electric Company and distributed it at retail in Palo Alto and vicinity, including the Stanford University.

In connection with my experience with the gas business, I have given considerable thought and study to the question of the treatment of depreciation and obsolescence of gas properties both from the engineering and the economic standpoint.

Mr. Searls: It has been suggested in this case that the loss of property through obsolescence due to changes in the art or inadequacy should be amortized after the loss occurs owing to the fact that the consumers of the future get the benefits of the lower rates or the improved service resulting from the improvements in the art; will you let me have your thought on that subject as to how the loss of investment due to obsolescence or inadequacy should be compensated?

688 Mr. Lowe answered: I think, in replying to a question of that kind, it is necessary to give considerable study to the local situation. I do not think the question of obsolescence has been of any great importance in California. I think the question of inadequacy has however been of very great importance. Western communities, as we all know, grow rapidly. While San Francisco has not grown as rapidly as some others, it has, nevertheless, more than what would be called a normal growth throughout the United States. Gas was first made in San Francisco from coal, I think—I am speaking now generally—and it was followed by the water gas, a process of my father's, and then ultimately the oil gas process which I invented. Those periods were pretty far apart. I am inclined to think that had due consideration been given to the growth of the community, possibly to the chance of change in the state of the art, that there would have been no difficulty in earning and setting aside a fund to cover obsolescence, but principally inadequacy during the time the plants were in operation.

From an engineering standpoint it is a very simple matter to determine the life of any portion of a gas plant at this time because of the experience of the past, the gas business being over 100 years old.

689 We know how long, for instance, gas holders are expected to last, how long purifiers last, how long gas making machinery lasts; we can very easily determine the amount that should be set aside year by year to cover the three factors really, obsolescence, depreciation and inadequacy, of which, as I say, I consider on the Pacific Coast inadequacy the most important. I have no sympathy with the theory of charging consumers of the present for obsolescence, depreciation and inadequacy of the past if that past has been quite a while ago. I think that those elements should be met by the consumers of today. When I say "that those elements should be met by the consumers of today" I mean that, in rates that are established, the question of depreciation, obsolescence and inadequacy should be taken into present consideration; that is to say, I think that the plants that are dying gradually now should be paid for by the consumers of today. I do not think the consumers of today should be asked to pay for property, for instance, that went out of existence ten or fifteen years ago. I don't know that that is the case, but I merely use it as an illustration.

Mr. Searls:

Q. Suppose that improvements in the art of manufacture of oil gas are constantly taking place, is it your opinion that provision should be made for obsolesced portions of the plant due to
690 the installation of new processes under the new improvements? Should such provision be made in advance of the installation of the improvements, or after the improvement has taken place? Supposing that the amount of the loss for inadequacy is so large that it could not be taken care of in one year's earnings, Mr. Lowe.

A. I think you would have to consider the local situation again in studying that situation. What would happen in San Francisco is totally different from what might happen in a small town. For instance, in San Francisco, you build for large gas making units now, probably as large as you would build a single gas making unit; those plants would not become inadequate; they might become obsolete if somebody invented a better method of manufacturing gas. It would be wise to discontinue the old method, but I do not believe that the gas making machinery today would become inadequate. In a small town it would be quite different because you would only build a small gas making apparatus, sufficient to meet the needs of the community and sufficient perhaps to anticipate for five years. If you anticipated them as much as ten years, I am inclined to think you would be spending capital unwisely. I think it would be reasonable to anticipate the growth for five years. I don't know
whether I make my meaning clear. I mean to say you must
691 consider everyone of those situations independently. So I

think that the question of inadequacy in the large gas making units that are being built in San Francisco today is not very vital. The question of obsolescence may be, although there is nothing at present on the horizon in the gas industry which looks as though it were going to, let us say within the next five years or ten years, drive oil gas out of San Francisco. I say this notwithstanding the recent increase in the cost of oil. It may necessitate and very likely will necessitate an increase in the price of gas, but I still believe that oil will be the fuel used for gas manufacture for a number of years. It is for this reason: We have large quantities of coal on the Pacific Coast and there will come a point at which it will be cheaper to mine and transport that coal for fuel purposes than it will to burn oil if the cost of oil climbs. There is a very, very large quantity. Of course, it is true there is a decrease in the production of oil all the time but long before oil will go out of use for the manufacture of gas it will go out of use for fuel purposes—steam making purposes. I believe there is no question but that oil will be used for the manufacture of gas in San Francisco exclusively for at least ten years.

Looking at it as an economic proposition, if the consumers of the present and the future have to bear the burden of this increase in the price of oil, I think the effect upon the salability of gas, if they should also be compelled to bear the bur-
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den of amortizing past losses due to obsolescence and changes in the art—the amortization of old plants which have been discarded in the past, will depend a great deal on how many cents per thousand cubic feet amortization of old plants would add to the price of gas. After people have used gas for fuel purposes, they will be very slow to return to any other kind of fuel; I think they would willingly stand a very great increase in the price of gas rather than give up the convenience and the cleanliness of gas as a fuel. If you asked me to put that a little more definitely, I would say that, if the price of eighty-five cents for gas in San Francisco today were doubled, the average consumer would still continue to use gas to almost as great an extent as he does now. That, however, would not apply to industrial uses because there other fuels would come into competition. While an industrial concern will probably pay a little more for the convenience and the cleanliness of gas as a fuel, it will not pay much more; a householder will pay a great deal more.

I do not think that the economic question is one that is materially affected by changes or by increase in the cost of manufacture or otherwise so far as the residential consumers are concerned, except
 693 in so far as the electric competition is concerned, and of course that is a factor. It is undeniably true, and any gas man who thinks otherwise makes a great mistake, that electricity is gradually driving out gas for lighting. It is also true that very little gas is used for lighting on the Pacific Coast, in the small towns almost none, and in Palo Alto not one tenth of one per cent of the gas sold is for lighting, it is all for fuel. And electricity cuts into the smaller uses, such as heating chafing dishes and curling irons and a thousand and one uses for which electricity is very, very convenient and maybe much more expensive though than gas.

Mr. Searls: I want to get your ideas on the question of changes in the art. As I understand your testimony, your opinion is that they should be provided for by reserves in advance of the obsolescence and not by future amortization?

A. Yes, anticipate them, set aside the fund as you go along.

Q. Ignoring for the moment the question of how you would provide for depreciation or for obsolescence as an accounting problem, or in your earnings, and looking at the question from the standpoint of present value of a gas works, I want to ask your opinion as a gas engineer and a gas works owner as to what would be the effect on the market value of a gas plant wherein certain units were obviously
 694 obsolescing or would be discarded by reason of obsolescence within a short time due to the changes in the art; would those units from the standpoint of the purchaser have one hundred per cent value because they could be used and give one hundred per cent service today, or would they be affected by this approaching period at which they must die because of the necessity of changing to the new process?

A. To my way of thinking, they certainly would not have one hundred per cent value; in fact, some of them might have very, very little value. Again, it goes to the question of inadequacy rather than obsolescence. I think certainly if I were buying a gas works,

and I have bought and sold a great many of them, I would not pay one hundred per cent for a piece of machinery that was going to be useful for only possibly a very few years.

Q. Suppose, on the other hand, you could take over the entire company, together with depreciation reserves which had been carried in the past so as to amortize the accrued depreciation and obsolescence in this plant, the situation might be different, might it not?

A. Oh, decidedly. If a depreciation reserve had been built up and established actually in a fund, or had that fund been used for the installation of new machinery and the extension of the property and had not been capitalized, I certainly would give one hundred 695 per cent of the value under those circumstances; but I would want either the money or the property for which the money had been spent; that is to say, the money that had been raised by establishing the depreciation fund.

Q. And you would not want to pay for it twice?

A. I certainly would not pay for it twice.

Q. Passing now to the subject of contingencies and extraordinary casualties, assume for the moment that ordinary fire and casualty risks are provided for in proper insurance reserves in a plant, what is your opinion as to the proper disposition to make of losses occurring from extraordinary casualties, such as war, invasion, earthquakes, or to take a specific example, the San Francisco earthquake of 1906 and the unprecedented conflagration which followed it; should the company be permitted as a good business proposition to charge off those losses from future consumers or should the company stand its loss along with the rest of the public?

A. I would think that it would be very unfair to charge a loss of that kind, a loss which you absolutely could not anticipate, to the gas user; I would have no sympathy of trying to make a recovery of a loss of that kind in a rate.

Q. And if it should not be permitted, the gas company to recover such a loss in future rates, do you think it would affect the 696 desirability of investments in the gas business so that it would be possible to find investors who would put their money in at a reasonable rate?

A. No, I don't think so. Of course, a thing of that kind makes it more difficult to find money; but there are certain classes of people who invest in certain things and they are familiar with the hazards of those particular lines of business. I think it is reasonable for them to expect a return and a safe guarding of their capital for anything that can be anticipated, but I do not think that they expect to be reimbursed for something which cannot be foreseen. I never in my experience have found it so.

Q. What is your opinion as to whether or not very extraordinary risks of that sort are reflected in the general market rate of interest for investments which prevail in a community?

A. I think it would increase—do you mean the cost of money, Mr. Searls? I have no doubt at all but that investors in gas properties in San Francisco would expect a higher rate of return than

they would in other localities because they would be aware of the fact that San Francisco occasionally has earthquakes, and little damages arising, and so on, which cannot be anticipated, and they are going to take an added risk and they want a little more money for it. I think that is true.

Q. Would that be generally true of all investments in San Francisco in businesses which would be likely to be affected by such disasters?

A. I think so; I cannot see that there would be any difference.

Q. So the general market rate of interest here might carry that very hazard?

A. To my way of thinking, that is undoubtedly so.

Mr. Lowe, on cross-examination, testified as follows:

In the fall of 1877, when I was seventeen years of age, I went into the shops of the Lowe Manufacturing Company and took practical instruction in the building of gas works.

Gas, at that time, was made principally from coal in the United States and in Europe, so far as I know. As my recollection serves me, my father's water gas patents were obtained in 1872. The process rapidly became a factor in the gas business in about 1876. The water gas process had been introduced in the plants of a few small towns. My father built the first gas works at Phoenixville, Pennsylvania, after the patents were acquired. Then followed a little plant at Conshohocken, Pennsylvania, I think. He tried very hard to interest the coal gas men in the water gas apparatus but without success. The two little plants that I have named were in towns where there had not theretofore been gas. Not meeting with very much success in interesting the coal gas manufacturers, he was compelled in making gas to install opposition plants. That was gradually being done. Communities that could not afford the installation of coal gas plants could afford water gas plants so that therefore many little plants not supplied with gas theretofore then became supplied.

From the very beginning my father's process was very successful. Of course, as time rolled on and the larger companies took it up and the apparatus was developed, it became better and better and better. But the principle of father's water gas process is exactly the same today as it was then.

The manufacturers of gas in the larger cities and towns did not earlier adopt and put into use this process that my father invented after he had installed it at a number of smaller places and had shown that it was a practical process and that it worked satisfactorily because of the general apathy of the gas man in doing anything new. That is a question that we are facing today in the gas business. To-day there are not a whole lot of real progressive gas men.

I do not think that the necessity for taking an additional investment had anything to do with the slowness of the gas manufacturers to adopt this new process. In those days the price of gas was fixed by the companies. There was no such thing as

rate regulation; they could charge what they pleased. There was no electricity. A fairly good quality of coal gas was made and sold for lighting purposes; very, very little for fuel. The average price of gas in the United States at the time that father invented his water gas process was \$4.50 a thousand feet. He immediately showed to the works that were in operation that that price could be cut to \$2.50 a thousand and the gas companies make more money then they were then making, and that it would give them an opportunity to increase the sale of gas for fuel purposes; but that did not seem to interest them at all; they actually had to have it hammered into their heads, just as I had to do the same thing in California with the oil gas process later; it had to be hammered into the old concerns before they would take it up, and when they found that somebody else would do it if they didn't do it themselves, they came in with a rush. That is human nature. The gas manufacturers, like other people, were very much inclined to say "let well enough alone", especially in those days when there was no competition from electricity.

700 In order to use the water gas process, so far as the manufacture of gas was concerned, it was necessary to erect different apparatus from that that had been used for manufacturing coal gas. There is the same purification, storage, distribution and things of that sort; the only difference was in the apparatus used for the manufacture of the gas; that is, what we call the generating apparatus. If a company decided to put in the Lowe water gas process, when it already had a coal gas process, it would either have two generating plants or else it would have to discard the coal gas generating plant. If it did discard the coal gas generating plant, it would lose a certain part of its fixed capital, unless it concluded that it was policy to run both; and that was the case of a great many companies and has continued throughout the history of water gas. The smaller communities discarded the coal gas apparatus entirely; the larger ones as a rule continued to operate both. That was because there was a certain demand for the by-products of the coal gas manufacture that warranted them in making a certain amount of coal gas at any rate. Then the coke resulting from the manufacture of coal gas could also be used in the manufacture of water gas. A combination of the two processes was, under some
701 circumstances, more advisable than the use of either one alone, depending altogether upon local conditions. It would depend very largely on the supply of coal and on the price of coal; for instance, in Pennsylvania, in New York, and in those sections where anthracite coal was cheap, it was a very easy matter to supplant the coal gas with the water gas. When you got to the New England states, though, anthracite coal was high on account of the transportation, and bituminous coal was high on account of the transportation, and bituminous coal from New foundland came rather cheaper. But it was a different proposition; it was harder to get the water gas apparatus in; there were other things to be taken into consideration; sometimes they installed the water gas apparatus

when the cost of water gas was no lower—possibly even more—than the coal gas because the water gas apparatus was very suitable for carrying a peak load; that is to say, coal gas works run twenty-four hours continuously and water gas is made intermittently, and they could install water gas apparatus and take care of their peak load requirements without building a new gas works. You can see it would be advisable under those circumstances to put in a certain amount of water gas even though it cost more than the coal gas, because of the economy in operation due to the fact that a large quantity of gas could be manufactured in a short time and then the works could close down for twenty-fours, and lessen capital investment.

702 In manufacturing gas by the water gas process, anthracite coal and oil were used. This oil was not what we know as oil on the Pacific Coast. There was a distillate known as nap-tha; in other words, it is about the same class of material we are now using to drive automobile engines. What we today call gasoline, we knew in those days as nap-tha. There was a great quantity of that that could be had at a very low price. That came from the Ohio and Pennsylvania oil fields. In the manufacture of gasoline, the oil companies had an enormous production of what they called nap-tha and what they today would possibly call a gas distillate. It was an oil of about sixty degrees Baumé.

There was another process of making water gas that was known as the Springer water gas process. The Springer method was an infringement on my father's patents. I don't think that Mr. Springer ever had any patents on his gas making apparatus. I knew Mr. Springer very well. I don't recollect that he had. Springer put the superheater over the generator, whereas father put the superheater opposite the generator. Springer started building gas works on the claim that his process was different from father's. He put in some machinery in Chicago, and some in New Haven,

Connecticut, and some here in San Francisco. Later that

703 type of apparatus became known as the Springer type. Litigation, though, followed the installation of the apparatus at New Haven, and it settled the Springer end of it entirely and father's patent was sustained and Springer was held to be an infringer. Subsequent to that time, a great many sets of water gas apparatus of that type were installed and were popularly known as the Springer apparatus, but the process was father's process. The decision establishing the validity of my father's patents followed immediately the organization of the United Gas Improvement Company. I think that litigation was probably in the early 80s, as I was married in 1881 and it was shortly after my marriage that the United Gas Improvement Company was formed.

So far we really have only one definite advance in the art of manufacturing gas within my experience; that is, from coal gas to water gas, and that was being manufactured under the protection of the patents which my father obtained.

The water gas process was coming into quite general use very rapidly as early as 1880 in the larger communities throughout the

central part of the United States; a great many small towns had adopted it before that. The larger communities were taking it up pretty freely about 1880 to 1885. The water gas process was used not to completely supersede the coal gas process in the larger places but was used concurrently with the coal gas apparatus and was considered as an auxiliary in the early history of the plants. The water gas process became the principal part of the generating apparatus used in the manufacturing plants and the coal gas process became the auxiliary about 1885. It continued to be the case until the increase in the price of oil forced the companies back to the manufacture of coal gas, and that has been very recent history.

The water gas process that was invented by my father in 1870 is still in general use over the whole world. I am not sure about Asia; I think there are some water gas plants in Japan as an auxiliary to coal gas plants. Throughout Europe they are very largely used. I would not call the water gas process obsolete yet. The water gas process is a very important factor in the manufacture of gas. The coal gas process is by no means obsolete and has never been obsolete. Coal gas is rapidly coming to the front in manufacture, especially with the increase in the value of the by-products, coke, tar and ammonia, and many things manufactured from the tar. In fact, the cheapest gas in the world sold anywhere is coal gas, the cheapest manufactured gas is coal gas.

The factors influencing the judgment of investors in gas manufacturing and distributing properties when they have to select as between coal gas process and the water gas process are that, in small towns, even with the increased cost of oil in the east, water gas would still be cheaper to make than coal gas for the reason that you can make it with one shift of labor whereas with coal gas you would have to employ three shifts now over the entire twenty-four hours; the labor cost in small communities would be prohibitive. When you get into larger towns however coal gas is now made at a lower cost than water gas; so water gas can only be considered of value as an auxiliary; that is to say, you can use it for making large quantities of gas in a short time or you can use it for consuming surplus stocks of coke.

The determining factor in the larger places is not wholly the cost of the material that enters into the gas in the choice of the two processes. It would be entirely so in a small community; water gas might cost more in a large community to make than coal gas and still it would be advisable to use the water gas apparatus as an auxiliary. There are two factors; the first is the cost of material, whether coal or oil, and the other this difference in the convenience of the process. Coal gas could be manufactured advantageously only upon the condition that our plant be kept constantly in operation for twenty-four hours a day. Water gas may be manufactured advantageously for a much shorter period of time each day. You can get a water gas apparatus ready for operation within half an hour's time; the workman will come into the plant and within half an hour after his arrival he will be turning out the full capacity of the ap-

paratus, that is, the rated capacity of the apparatus. Then when the gas is made he can shut down and in five minutes time he leaves his work and goes and it stands there with a slight consumption of fuel in the generator until he comes back the next day. It is very common practice in small communities to make the water gas entirely within three or four hours' time.

There are three processes in the manufacture of gas that have come into sufficiently general use since the beginning of my experience with the gas business in 1877 so that they are used by a considerable number of communities; namely, the oil gas process, which I invented, such as we use on the Pacific Coast, the water gas process and the coal gas process. There are no other processes that are used in manufacturing gas on a commercial scale, for fuel and lighting purposes. Of course, there are different kinds of oil gas plants here and there in very small communities where a little oil is retorted; there are auxiliary plants in small towns where air is saturated with gasoline vapor and supplied, and so on, but we don't regard those as commercial operations. The only three processes of manufacturing gas of any prominence at all are those I mentioned above. I consider all of these modern up-to-date processes, where the conditions are such as to admit of a profitable use.

It is practicable to use this oil gas process as an auxiliary to the apparatus used in manufacturing gas by the so-called coal gas process. The operation of oil gas apparatus is very much like the operation of water gas apparatus. If the cost of the coal used in one process and the cost of oil in the other process were on fairly similar terms, the oil gas process could be used concurrently with the coal gas process in the same way I have stated the water gas process can be used advantageously in connection with the coal gas process. If the price of coal is too high, or if coal is not obtainable, you can then do nothing but manufacture gas from oil. The element of cheapness enters right there. Oil or water would have to be used; but there would be a great deal of difficulty in using the water gas process on the Coast now because of the lack of a suitable supply of coal. In manufacturing water gas under my father's process, he used a solid fuel, which was generally anthracite coal, where anthracite coal was procurable; if he could not get anthracite coal he used coke. Either one was entirely suitable. To operate a water gas plant successfully,

you must have hard fuel of some kind. I do not know of any hard fuel procurable on the Pacific Coast at a reasonable price.

There is no anthracite coal, of course, except that which is brought from Colorado; possibly it would cost about \$16.00 or \$18.00 a ton; coke brought from Vancouver or Washington probably costs from \$12.00 to \$14.00 a ton, and at those prices solid fuel would be prohibitive for that use.

I consider the water gas process as impracticable in California today under existing conditions as compared with the oil process. You could not begin to make gas as cheaply with the water gas process as you can with the oil gas process even at a considerably increased price of the water gas process.

That condition has prevailed ever since oil was discovered in Cali-

fornia. The first oil gas plant built in California was in Los Angeles in about 1887, I think. Of course, there was not a very large production of oil, but there was plenty for gas manufacture. The price of oil at that time was about \$1.00 a barrel. Of course, it gradually fell very much lower; in fact, for a long time after the installation of oil gas apparatus became pretty general in California, all the oil that was procured was procured from the Los Angeles section; it was after that that the great development in the Kern fields took place; that is comparatively recent. The oil was much cheaper in Los Angeles than it was in the northern part of the state. The price of oil
709 in San Francisco was the local price plus the cost of transportation. It was not as high as \$2.50 a barrel. I think the freight rate on the oil from Los Angeles to the lower sections in the central part of the state, in which we first built oil gas apparatus, was about forty-two cents a barrel, about one cent a gallon; that is my recollection.

The first plant using the oil gas process in this section of the state was built in Chico, and that was in 1899. After that I began to install plants very rapidly. Immediately following Chico was Hollister; they came so fast that I lost track of them. The first large city in which the oil gas process was established in the northern and central parts of the state was Oakland. That was after the formation of the California Gas & Electric Corporation in 1902. Prior to that time, and at the time that the oil gas apparatus was installed, the water gas process had been used in Oakland. I am not sure whether they were then running any of their coal gas benches or not, but water gas and coal gas had been made in Oakland. They still had some of their coal gas benches. I remember that very clearly because some of them were under fire for certain purposes, I don't know what, and we fired up others for the purpose of making certain experiments in making coke from lamp black.

710 I do not recall when the oil gas process was introduced in San Francisco. The first oil gas apparatus, I think, that supplied San Francisco was Martin Station. I don't remember just the year. I sold the patent rights to this section of the country to the California Gas & Electric Corporation and they built their own apparatus and I paid no attention to that. I was interested in the California Gas & Electric Corporation for a long time. I parted with my interest in that company between 1903 and 1906. I had some stock in the California Gas & Electric Corporation at the time that Henshaw and that little coterie of men came in. That was some time prior to 1906.

To tell you of the history of the use of the water gas process in Los Angeles after the establishment of the first oil gas apparatus down there would be the shortest way: The first oil gas apparatus was built in Los Angeles, I think, in about 1887; that was operated by a company which father had bought out. As a matter of fact, we built some gas making machinery, machinery for manufacturing what was known as blue water gas, for some people in Los Angeles. Not getting our money very promptly, father went down there to collect

the bill; instead of collecting the bill he got the gas works. I had just about that time invented the oil gas making apparatus and we

711 had had a little experience with it in Lynn, Massachusetts. Father thought it would be a very good thing to use in Los Angeles because while there was not much oil then, there was plenty for the manufacture of gas and it was very cheap. So he took over the property and installed an oil gas apparatus. That plant was running in opposition to the water gas plant there and in time the two plants were consolidated. Following the consolidation of the properties, the new owners discontinued the manufacture of gas from oil, for what reason I have never been able to conceive, and installed water gas apparatus.

Father sold his interest in the combined company down there to get money to build the Mount Lowe Railway. That was in 1892 or 1893, or along in there. I suppose the consolidation took place somewhere about 1890, or 1891, or 1892—early in the 90s. Then they manufactured the water gas for a number of years and finally, to my way of thinking, came to their senses and installed oil making apparatus which they had the right to do under my patents because they went with the property that was consolidated. There was some water gas apparatus also used in connection with that coal gas plant in Los Angeles, but that was entirely discontinued, and they went at water gas alone and then the oil gas followed that.

712 About the time that the California Gas and Electric Corporation was organized, I granted to that corporation the privilege or license of using my oil gas process under my patents that had been issued and had been applied for up to that time. There were some patents subsequently in which they were not interested. The assignment was limited to rights under the patents which then had been granted or for which my applications were pending.

I granted or assigned the rights under these patents for the City and County of San Francisco, and, I think, San Mateo County, to John Martin sometime prior to 1906. John Martin afterwards assigned them, I think, to the California Gas & Electric Corporation. My memory is not clear on that. I think there was an exemption of some kind. I know that in a second step in that proceeding I received a subsequent payment of something like \$10,000.00 for some additional territory; just what it was I don't know. I granted rights under these patents to certain counties in the State of California at first, and then afterwards I granted rights as to certain other counties.

The San Francisco Gas & Electric Company never obtained the right to make use of my patented apparatus or process. I never had any dealings with that company of any kind personally, 713 unless in the assignment to Mr. Martin it might have been done in that way. My dealings were with Mr. Martin. It may be possible it ran directly from me to the San Francisco Gas and Electric Company. I didn't pay any attention to that.

Mr. Bosley: I have examined the original assignment and it ran from you to Mr. John Martin as to San Francisco, and also I think San Mateo County, and possibly San Joaquin County, although I am

not sure of San Joaquin County. There was some arrangement made with you by which those rights were acquired by Mr. Martin and he afterwards assigned either some or all of them to the California Gas & Electric Corporation.

The witness continued:

To the best of my knowledge and belief no rights under those patents were ever transferred to the San Francisco Gas & Electric Company.

At the end of 1905, what was known as the Lowe crude oil water gas process and the apparatus used in connection with that process had been brought into successful use in a number of the smaller towns and cities in the central part of the State of California, and in the City of Oakland. At the time that the Oakland plant was built, it had not been brought into use at all in the City and County
714 of San Francisco, but just how long thereafter it was that the apparatus was put in in San Francisco, I don't know, because I did not build it. At any rate, up to the time that the plant was built in Oakland there was no oil gas making plant in San Francisco under my process.

Martin Station in San Mateo County was built in the latter part of 1905 and 1906 and began to produce gas which was sent into San Francisco sometime in the early part of 1906, I think in February or March, 1906; it was before the earthquake and fire, I know that. After January, 1906, a plant was constructed down at the Potrero for the manufacture of oil gas, and that was brought into operation I think in March, 1906.

Aside from the oil gas process, there were only two other processes to manufacture gas on a commercial scale for the purpose of illumination and fuel that were in existence in 1905 and 1906; coal gas and water gas. The water gas process was the one that was in use in San Francisco at that time supplemented by a coal gas system. I don't know just when they discontinued the manufacture of coal gas but they had two extensive coal gas plants at the time they were operating with water gas, one at the Potrero and one at North Beach; just when they discontinued the manufacture of coal gas I don't
know.

715 The coal gas process and the water gas process were processes that could be used very well in conjunction, and the extent to which either process would be used would depend in part upon the price of coal and the price of oil and in part upon whether the demand for the output of the plant was steady and uniform or was subject to peak demands.

I would not consider that, at the end of the year 1905, the water gas process was an obsolete process for a company to use unless it could obtain the rights under the Lowe patent for the use of the oil gas process; in fact, I should not consider that the water gas process had ever even to this moment become an obsolete process. One could take the lampblack and if there was no outlet for it, the lampblack could be used in the manufacture of water gas. In that way the

water gas plant could be operated economically in connection with the oil gas plant.

Up to the time I transferred the patents covering the oil gas process in 1902, I had control over them. Whoever obtained rights for the use of the oil gas process *process* and apparatus had simply succeeded to my position with reference to San Francisco. It is my opinion that at that time the oil gas process was decidedly a more economical process than the water gas process here in San Francisco.

Mr. Bosley:

Q. Put yourself in the position of the San Francisco Gas
716 & Electric Company we will say in the year 1905, owning a gas manufacturing plant consisting in part of apparatus designed for the manufacture of coal gas and in part for the manufacture of water gas, and assume that some other person owned the right to use the oil gas process protected by the patent which you or your father obtained, would you have considered it sound business policy to acquire the rights under the oil gas process for use in San Francisco?

A. Yes, I would.

Q. Would you have expected to get those patents for a nominal consideration or would you expect to pay substantially for them?

A. I would have expected to pay very handsomely for them.

Q. Why?

A. Well, in the first place, the difference in the cost of manufacturing gas from oil as compared with either coal or water gas was so great that within a comparatively short time you could have set aside funds sufficient to pay for any reasonable price which you would pay for the patents and the installation of the gas making machine.

Q. That is assuming, I suppose, that the prices for gas had remained substantially the same or had not been reduced so as to deprive you of any margin of profit?

A. That is true, on the assumption that you maintain your
717 selling ratio. In the second place, by purchasing the patents you remove the menace of competition.

tion in determining the reasonable price to be paid for the patents?

A. Oh, yes.

Q. And both of those elements you think are entitled to consider.

Q. Now let me present the same thought in a slightly different aspect. Suppose you had been in 1905 the owner of the San Francisco Gas & Electric properties, that is the manufacturing plant and the distribution system, and suppose that you had acquired the right under the patents from the patentee to make use of the oil gas process and apparatus in San Francisco but had not as yet installed any apparatus in San Francisco for the manufacture of gas by the oil gas process, would you have considered it good business policy to proceed promptly with the construction of oil gas manufacturing apparatus and upon its completion to abandon the water gas process and the old coal gas manufacturing plant?

A. You ask two questions in one: I certainly would consider it very wise to immediately construct the oil gas making apparatus. As to the abandonment of the other two, that depends altogether on circumstances.

Q. What can you say with reference to that point in view of your knowledge of the situation as it was at that time?

718 A. Taking into consideration that the coal gas plants that were then in San Francisco and the water gas plants were large units, very modern, and would probably be good for a great many years to come, they would neither be obsolescent nor would they be inadequate; then it would be merely a question as to good business judgment whether to retain those plants with the expectation of using them sometime in the future. Anticipating possibly a great increase in the price of oil, I think it would be wisdom to retain the plants.

Q. Both plants?

A. Both plants. That would not apply, however, in a small operation.

Q. Take the situation with reference to your proposed installation of an oil gas plant, and your water gas plant; you stated a moment ago that the water gas plant could be operated by making use of the lampblack as a residual product of the oil gas manufactured?

A. Yes, sir.

Q. In the absence of a market for the lampblack would you have considered it good policy to retain the water gas plant and to operate it concurrently with the oil gas plant?

A. Yes, sir.

The witness continued:

719 With reference to the coal gas plant, if I believed that the production of oil was such that it was improbable that I would ever return to the manufacture of coal gas in view of all of the conditions, I might abandon the operation of the coal gas plant, but, with the thought of impairment of capital in mind, I would probably not have dismantled it at least until I had amortized it. I would at least want to see that plant standing there even if I was never going to use it, or I would want to see the value of it in a fund.

If I had the coal gas plant and the water gas plant and I proposed now to erect my oil gas plant, and I did not dismantle my coal gas plant but ceased to operate it, I would take two views as to whether the coal gas plant could from that time on be considered as a part of my property used and useful in the manufacture of gas; namely, one from the operating and the other from the capital standpoint. From the operating standpoint, if I felt I was no longer going to use the coal gas works and they were in my way and I needed the land on which to put other structures, I would say take them down. From the capital standpoint, I would say let them stand. Unless, as I stated a moment ago, they had been there sufficiently long to have been amortized over a reasonable number of years and I had the money, I would feel that my capital was impaired if that plant was not there.

720 Suppose I erected my oil gas plant and I operated it and concurrently therewith during a whole or a part of the time my water gas plant and made no use of my coal gas plant and did not operate it we will say for a period of several years, and there was no prospect of my having to operate it at any time within a reasonable time in the future for the manufacture of gas, I think I could consistently go before the Board of Supervisors or before the Railroad Commission and say that the coal gas plant was property that was then being used, or was then useful in the manufacture and distribution of gas in San Francisco on the theory that, if I found difficulty in getting capital to put in additional making machinery, my coal gas plant would be there to manufacture gas. Assuming that I had already obtained the capital and constructed my oil gas plant of sufficient size to take care of present requirements and the requirements for a reasonable time to come, I would consider the investment in the coal gas plant was a proper one on which to earn a return if I had not had an opportunity to amortize it over a reasonable period. Omitting the question of whether or not it has been amortized and just looking at the facts as I have just stated, I would not say that that coal gas plant was actually being used in producing gas, nor could I say that there was any immediate prospect of using it for the production of gas for sometime to come.

721 In that case, it would continue to represent an investment that had been made at some prior time, and if it had been amortized, I would be satisfied to write it off my books; but if it had not been amortized, writing it off my books would depend on whether I had had a reasonable opportunity to amortize it. I might not have amortized it. I might have allowed it to stand notwithstanding that I had sufficient earnings to amortize it. That would be the governing factor, whether I should or should not have amortized it. Naturally, by amortizing it, it would write itself off.

If I did not have sufficient earnings to amortize it that introduces a new element. If I were threatened with competition, if some other concern had the right to come in and compete with me, and if I was not a regulated monopoly, because at that time any one had the right to build gas works in San Francisco, I would feel I was taking a somewhat business hazard and that it might not be fair to ask the consumers to pay for that property; on the other hand, had I been a regulated monopoly, I would then feel that I was entitled to a return on my money on some stage of the game.

Suppose I had been the owner of the San Francisco gas properties for fifteen years, and during that time had operated both the gas manufacturing plant that used coal, and the gas manufacturing plant that used the combination of coal and oil producing the so-called water gas; suppose that during that time I had not either amortized my coal gas plant nor had sufficient earnings to enable me to amortize my coal gas plant and obtain a fair return upon my investment, and I were placed in a position where I knew that by the introduction of the oil gas process I could manufacture gas more cheaply than I could by the combination of the coal gas process and the water gas process, and that I obtained the rights under

the patents to manufacture gas by the oil gas process, so that I were freed from the danger of having a competitor acquire that process and come into my territory and operate in competition with me, and that the coal gas plant and the water gas plant were both in good condition and adequate to produce the amount of gas required for sale here at that time and for a reasonable time in the future; in other words, that, within a period of fifteen years, I had not been able to earn sufficient funds to give me a fair rate of return on my money and to amortize at least a portion of my plant, and I had control of the rates and knew the situation when I was entering it; and I then had the question presented to me is it better business policy to put in this oil gas manufacturing plant, assuming that I could readily obtain the amount of capital required for that purpose or actually had the capital available for that purpose, and discontinue the use of the coal gas manufacturing plant and have it become a non-operative property, I would say that in all probability my money had been
723 unwisely expended. Had the time been limited to five years, or any reasonable development period, my reply would be different. But when it is taken up to fifteen, twenty and thirty years it seems to me that anyone familiar with the gas business would know about what they were to meet in that situation and would feel that they could earn it out on the prices at which they could afford to sell gas for and which the people could afford to pay for it. Then if that situation did not materialize I would be inclined to think that that capital had been unwisely expended, and if unwisely expended then I do not think the consumer should be asked to pay for it.

Mr. Bosley:

Q. I am not asking you anything about what the consumer should be asked to do; I am just trying to see how you as a business man and a man experienced in the gas business would deal with the practical problem that confronted you. Now let me present a case limited to five years. Assume that you had a gas manufacturing plant that used the coal gas process and the water gas process, and that you had had that in use for five years, and we will assume that your rates were subject to regulation, as they were, and we will assume that during that period of five years you had been able to earn a fair return on your investment, but not enough beyond that to enable you to set aside a fund sufficient to amortize the coal gas apparatus, and you now acquired the right to use the oil gas process, and you
724 knew that you could manufacture gas by the oil gas process more cheaply than you could by the combined coal gas and water gas process; you have your investment in your coal gas plant and your water gas plant; you are able to obtain the money required for putting up additional apparatus for manufacturing gas with the oil process; now you have a practical question presented to you, whether it is or is not better under these conditions to continue to use the old coal gas plant and the water gas plant until your apparatus shall have reached such a stage of depreciation that it is wise to replace it, or to immediately construct your oil gas apparatus and put that into use, although the putting of that into use results at

once in abandoning the operation of the old coal gas manufacturing plant; what would you do under those circumstances?

A. Under those circumstances I would expect to earn out the value of the coal gas and water gas apparatus.

Q. What would be your course of conduct? Would you put in the oil gas apparatus?

A. I would put in the oil gas apparatus and I would attempt to charge the same rate for gas, unless I saw fit to voluntarily lower it, and I would use the extra amount of money that I earned from the operation of the oil gas plant to wipe out the unamortized value of the coal and water gas plants.

725 Q. Or if you were abandoning only the coal gas plant, then you would want to amortize the investment in the coal gas plant?

A. Whatever I was going to abandon, yes.

Q. Would you think it proper business policy to discard the coal gas plant and immediately reduce the rates so that they would just yield a return on your investment represented by your distribution system and your oil gas plant and your water gas plant?

A. Oh, decidedly not, because under those circumstances there would be no sense in putting in the improvement. The situation, as it presents itself to my mind under those conditions, is that the consumer would be the only one getting the benefit.

Q. Suppose the amount of investment in your coal gas manufacturing plant represented, in round figures, we will say, \$500,000.00; suppose you estimated that the annual savings to be effected by the substitution of the oil gas method of manufacture over the methods that were then in use, would be, we will say, \$10,000.00 annually; let us assume now that the coal gas manufacturing plants and the water gas manufacturing plants were in such condition that they would be sufficient to manufacture all of the gas required for serving San Francisco for the next ten years, would you then substitute the oil gas plant for the coal gas plant?

A. Not at a difference so small as \$10,000.00.

726 Q. Suppose, however, at the end of five years, you found that you had to have an additional generating unit, even under those circumstances, what kind of a unit would you put in, an oil gas unit, a water gas unit, or a coal gas unit?

A. Mr. Bosley, I can scarcely conceive of an operation involving an expenditure of half a million dollars for gas making apparatus and—

Q. Well, let us take that example, because we can substitute any other figures.

A. No, I don't think you can, because the difference would be very much greater. If there was any advantage at all in installing gas making apparatus, you would look for a greater saving than \$10,000.00 a year; it would be more likely \$10,000.00 a month.

Q. Let us assume there was only a \$10,000.00 saving.

A. Well, then, I would say it would be scarcely worth while to put it in.

Q. But if you reached the point where your plant was inadequate

and you had to put in a new unit, the saving of \$10,000.00 would be worth while, would it not?

A. Yes.

Q. And you would put in a new unit of that type?

A. Yes.

727 Q. You would not put in a new unit where it would result in the abandonment of a unit of the old type that was in good condition, would you?

A. No, I would not.

Q. Suppose we have your coal gas manufacturing plant representing an investment of \$500,000.00, your water gas plant representing an investment of \$500,000.00, and the cost of the installation of the oil gas plant that would be sufficient to enable you to abandon the operation of the coal gas plant would be only \$250,000.00; suppose the amount of the annual savings to be effected by the substitution of the oil gas process for the coal gas process was \$150,000.00 a year; in that case would you hesitate about putting in the oil gas process?

A. Not for a moment.

Q. You would count that you would be able to amortize the entire investment in the coal gas process out of the savings in a little over three years—three and one third years?

A. Yes.

Q. And even though the old coal gas plant had ten years of usefulness left, you would think it better policy to abandon its operation and put in the oil gas plant?

A. Decidedly. I would go even further, I would say that one of the inducements for putting it in would be that I could benefit the consumer; that I might, in addition to getting increased
728 earnings myself, be able to reduce the price of gas and in that way help the consumer and give me an opportunity to sell more gas.

Q. Benefit yourself and the consumer?

A. Yes; and I might not be able to amortize the value of the old plant quite as quickly, but I would do the community a decided good, and ultimately do myself a good as well.

Q. And under the conditions where you could effect a saving of \$150,000.00 a year and it would result in the abandonment of the coal gas plant representing an investment of \$500,000.00, you would not expect to reduce the rates immediately to those that would just afford a return on your oil gas investment and forgot that you had ever made an investment in your coal gas plant?

A. Certainly not.

Mr. Searls: The last few questions have all been based upon the preliminary hypothesis of the five year operation that Mr. Lowe made when he answered these questions. I don't want any confusion in the record on that.

Mr. Bosley: I think it is immaterial whether they have been or not, but I am willing to have it considered that the old plant was only in use five years.

Mr. Searls: He stated very positively that if it had been ten or fifteen years he would have taken a different point of view.

729 Mr. Bosley:

Q. Now, Mr. Lowe, does not the consideration you have given to these questions really lead to the conclusion that, if you have an existing plant that is in good condition, good operative condition, and has quite a substantial life expectancy, and you find that a new process has been invented, and you are able to obtain the right to use that invention, you will consider the comparative advantages of abandoning your old plant and availing yourself of the savings effected by the new process and of continuing to operate the old plant and avoiding the abandonment of the old investment?

A. That is to say, as I understand the question, putting it briefly, you would consider it advisable to do that?

Q. Yes.

A. I would give consideration to those factors, yes.

Q. You would want to determine which way the greater advantage lay?

A. Yes, surely.

Q. The permanent abandonment of operation of two existing plants and the construction of a new plant of a different type to take its place involves, to a certain extent, the abandonment or loss of capital, does it not?

A. I don't see how you can destroy anything without involving the loss of capital; it seems to me in my mind I give your question a somewhat different construction; maybe I am wrong; suppose you explain it a little?

Q. What I want to get at is this: Suppose you have a gas manufacturing plant, and the demand is such that you have to produce, we will say, a million feet of gas a day; you have a plant now that has sufficient capacity to produce a million feet a day and take care of a reasonable future growth; somebody comes along and tries to induce you to substitute a new plant for the one that you had; you do not need two plants; your old plant produces the required quantity; the new plant will produce the required quantity; if you decide to put up a new plant and use that, it involves a cessation of the operation of the old plant, without any other elements entering into the problem, and it will involve the wrecking of the old plant and taking out what salvage you can get.

A. Yes, and the loss of capital.

Q. In other words, it amounts to abandonment of a certain amount of capital?

A. Yes, if you do not, as you say, introduce other elements.

Q. Now, in that case, suppose you had invested \$500,000.00 originally in your manufacturing plant, and your new plant represents an investment of \$500,000.00, the moment you have completed the

erection of the new one you have a total investment of a million dollars, haven't you?

A. Yes.

Q. But only one half of that is in condition to be used; you would decide to abandon the use of the old one; suppose you realized \$100,-

000.00 salvage out of the old plant when you wrecked it; \$400,000.00 in capital has been displaced, has it not?

A. Yes.

Q. Now, would you go through that process unless you were pretty well convinced that the saving to be effected by the use of the new process would be sufficient to reimburse you for that \$400,000.00 of loss of capital as represented by the abandonment of the old plant?

A. No, I would not incur that loss unless I saw a corresponding gain, again adding the words I did before—without introducing other elements.

It is my opinion that, under conditions prevailing now and conditions that have prevailed for say the last five or ten years, a reduction in the price of gas would probably result in an increased demand for the gas, but not necessarily an increased output. It might or might not. While you might very easily create an increased demand, your loss to other competitive channels might be more than your gain. Assuming that the increased demand results in an actual increase of sales, the natural effect of the reduction of the price is to place the gas within the reach of more people, to increase the output.

732 That being the case, if I had an opportunity to put in a new process for the manufacture of gas that would result in a very considerable diminution of cost, the first consideration is to avail myself of the advantages resulting from the diminution of the price so as to increase my output, provided I could increase my actual net gains in operation.

Mr. Bosley: Now there is another problem involved here: Suppose you had been the owner of a gas manufacturing plant consisting of the coal gas retorts or benches and a water gas generator, and you had been the owner, also, of the right to make use of the Lowe patents, or the Lowe inventions for the manufacture of oil gas, and that a willing purchaser—one who desired to become a purchaser—approached you and desired to purchase the entire properties that you possessed, in connection with this gas manufacturing plant, would you under those circumstances make a price to that purchaser that would discount substantially the value of that old apparatus that you had in use because you knew that it could be replaced with new apparatus that would be more effective if he at the same time demanded that you assign to him the right to use the patent?

A. If I understand your question correctly, Mr. Bosley, I would strive to get all the money that I possibly could for the plant, whether it was worth it or not. That would be my position if I were selling it.

733 Q. If the other man had the right to use the new process and you did not, and you were afraid if you did not sell out to him he might be a competitor in the business, the fact that your manufacturing plant was obsolescent or obsolete would be taken into careful consideration by you, would it not?

A. I possibly under those circumstances would not go that far,

I would possibly let him have it at his figure, if I was pretty sure that he had a club with which to beat me to death if I didn't do it.

Q. But if you had the right to hold the patent and he did not, then what would you do?

A. Then I would hold stiff at my price, if I knew that he could pay my figure.

Q. You would not reduce the price for your patent and your apparatus to the value of the obsolete plant, would you?

A. Certainly not; under those circumstances, in a trade of that kind, that would not be a factor. I would probably try to make him pay more than the plant was worth, and for the patent as well.

I think that is the way the ordinary business man would act; I am quite likely human in that respect.

734 Mr. Lowe continued: The oil gas process was invented by me about 1887. The patents were issued in June, 1889. We sold the plant at Lynn, Massachusetts, early in the spring of 1889, in fact, I think it was in February, 1889, we sold the plant, and it had been a year before that that I worked experimentally on the apparatus. I think it was about 1887 that I invented it. I know the patents were quite a long time in coming through the patent office. The patent itself will show that, because it was not very long after I conceived the idea that I made application for the patent.

I had been in the gas business about ten years before I made that invention. During all that time I had been actively engaged in the gas business, and had been keeping in touch with the developments in gas manufacture and was quite familiar with it.

I conceived the idea that was eventually perfected and that resulted in my patent for my invention somewhere about 1887. I think I made the invention at the time I conceived the idea. I am trying to see if I can get any other definition; it seems to me that the conception of the idea and the invention are coincident. I have taken out forty or fifty patents, principally covering gas matters, but also on other things, because I inherited a little of my

735 father's inventive ability. Of course, you understand that the ideas that come to the mind of a man who has inventive genius are sometimes rather crude, sometimes they can be worked out mentally, and sometimes they have to be experimented with. I think the first time that I thought that this kind of gas could be made from oil in this manner was before that, because at Lynn we were not operating an illuminating gas plant, we were making what we call blue water gas, no oil was used at all in the manufacture of it. So this thought must have occurred to me at some time when we were operating a gas plant elsewhere; we had a number of them. There was a prohibition in Massachusetts against the manufacture of gas containing more than a certain per cent of carbon monoxide. It looked as though that restriction was going to be removed in the fall of 1888, and we got ready to make illuminating gas instead of the blue water gas. This apparatus that was put up was built with the idea of being ready to throw illuminating water gas into our mains in place of the blue water gas, that is, illuminating water gas made,

however, only from oil. I gave the name crude oil water gas to it to distinguish it from father's water gas process. As a matter of fact, crude oil water gas is a misnomer, because while there is a little water gas in it, there is not nearly as much as I imagined in the first place; otherwise, today I would not be sitting here, I would be a multi-millionaire. The law was not repealed and we got disgusted with the operations in Massachusetts; we fought there for many, many years; we sold our plant. Meanwhile, father had gone, as I said, to California, and installed a gas making apparatus under the oil system in Los Angeles; on the way out I stopped at Colorado Springs and fancied the place and bought the gas works there and installed an oil gas making apparatus there. It was in Colorado Springs and in Los Angeles that the development of oil gas was made. The conception of the idea was in Massachusetts, as far as I can clearly state, possibly in 1886 or possibly in 1887; the thought, though, may have occurred to me a long time before that, that something might be done in that way, but there was no use for it, there was no cheap oil. It was not until we were in Massachusetts that the production of Lima oil that came in in large quantities from the Lima fields and Ohio was started. At that time oil was very, very cheap, and we could have landed it at a little over a cent a gallon in Massachusetts; taking an average of about ten gallons to a thousand cubic feet at a small plant, we could have made gas at a material expenditure of about ten cents.

It is perfectly obvious that I have certainly never been able to predict in advance when I was going to make an invention, and much less could any one else tell when I was going to make one. I dreamed one. I worried myself sick over a safety device on a gas governor and I couldn't get it. One night I dreamed it. My brain cells were at work. They didn't go to sleep. It came with such a sudden shock that it awakened me. When did I make the invention? I don't know. The complete thought came to me in my sleep. I had been working on it for a long time before. It has been my experience, too, that after I have made an invention, it has taken some little time, and sometimes a very long time, to devise the apparatus by which the invention could be made use of to the best advantage. And then it has taken some time to induce other people to try the apparatus. That is the principal trouble. Of course, if inventors were possessed of large means at the time they made their inventions they would develop very much faster. But that is usually not the case. We are compelled to look to others for financial assistance. Now, in the gas business, the only outlet at all for an invention is through the existing gas companies and those that may be organized. The opportunities are not many. When father invented his water gas system, it was a very, very uphill job to get any of the old coal gas men to think of it for a moment. I think I said before that the same thing happened when I invented the oil gas method and brought it to California. I could not induce anybody to use it here. I found the gas companies already in the field reluctant to make an additional investment for the use of a process they did not fully understand.

I don't know what it is; it seems to apply only to the gas business. If there is a slower and more apathetic man in the world than the ordinary gas man, I have not found him. There are very, very few progressive men in the gas business.

Going back to the question of the effect of lowering rates on the sale of gas, the tendency, resulting from experience in the business, is for the owner of the gas plant to lower his rates to the point where he will get the largest net profit, instead of keeping them up as high as possible. I think the gas business has been a marked exception in that respect. The general trend of gas rates has been continually downward, ever since I have any knowledge of the business, and long before that. The gas men have voluntarily reduced the price of gas. They have been compelled to. Gas companies have never been very big earners.

Assuming that the owner of a gas manufacturing and distributing plant is convinced that he must make the rates as low as he reasonably can in order to increase his output, and at the same time
739 get the largest net profit, the factors that he will take under consideration under ordinary conditions for the purpose of determining where is the point where he can get the largest net profit will be the amount of his investment and a reasonable rate of return on that, and the cost of operating, including the cost of materials and labor. He will include all those things. I think we have to go back, in order to make that thoroughly clear, a little bit further. When I first went into the gas business there was no such thing as scientific rate making. What we did was to operate our plants as best we could and build up a fund, if our earnings were sufficient to give us a return on our capital, we would gradually set aside a fund until we thought that fund was large enough to anticipate something we were going to need, for instance, a new gas holder, or a new gas making machine, or something of that sort. When we had that fund established, based, however, as I say, on no theory, nothing more than the accumulation of money in the bank, then we would reduce the price of gas, knowing that we could increase sales. Still, we felt safe in having a certain amount on hand to provide for contingencies. We proceeded on the plan of building up a surplus and not distributing all our earnings as dividends. That is the same principle that the banks apply. Later, we began to discover
740 that there was such a thing as a scientific method of reaching this surplus by studying the probable age of the various portions of a plant, and then establishing what we call depreciation funds by setting aside a certain percentage of the cost of the property, and building up a fund in that way. That is the method that is followed today.

Mr. Bosley:

Q. In connection with that, Mr. Lowe, if we go back now to the period between 1880 and 1900, did you ever know of a gas company setting aside a reserve to be used for amortization of the value of its manufacturing plant because it anticipated that somebody might

invent a new method, or a new process, or a new apparatus, which would take the place of the old?

A. No, sir, I never heard of anything of that kind.

Q. When did you first hear of anything of that kind?

A. Well, I don't know that I ever have, that anyone has set aside money in anticipation of an improvement in the art that would force them to make a change.

Q. I might qualify that by saying, until the discovery had been made, and the fact that there was an improvement became known to the owner.

A. Then, of course, you would not have time to set it aside,
741 because right away you would need it, and long before you would have time to set aside enough money to acquire this improvement you would have to have the improvement.* So it would be either, if they had not in this fund that I tell you prudent gas companies build up—if they didn't have money enough in the fund to acquire it, then they would have to sell securities.

Q. But this fund that you are talking about is one that is built up in the expectation of the normal development and growth of the business, without including unknown and unpredictable discoveries in the future?

A. Not the additions, not the betterments to the property, Mr. Bosley, such as street mains, services, meters and things of that kind, because they were always provided for at the expense of new capital. For instance, we might have a gas holder in a small town, we would know that as the town grew that gas holder was going to be useless and the time would come when we would have to have a larger one, and we would build up in anticipation of that.

Q. You would provide, then, for the things that you knew about?

A. Yes.

Q. The things that you could anticipate, from your past and present experience and knowledge?

A. Exactly.

742 Q. But you never knew of the case of a fund being built up in anticipation of the substitution of a new process that had not yet been invented?

A. No. I would regard it almost as—what shall I say—well, foolish.

Q. You never knew of a practical business man making provision for a thing he could not predict or anticipate?

A. I certainly should not.

Q. Did you ever know of any business man setting up funds to provide for extraordinary and unpredictable catastrophies, such as the earthquake and fire of 1906?

A. No, except in so far as you could provide against it by insurance; not the establishment of a reserve.

Q. Have you ever known of any insurance against earthquake?

A. No, not prior to that time. I believe there is something of the kind now, but I am not familiar with it; I do know that there are earthquake insurance companies, I have heard of them but never have studied them.

Q. Have you ever known of anybody setting up a reserve or contingent fund to provide for such losses as that that occurred on April 18, 1906, otherwise than by taking out insurance against fire?

A. No, I have not.

743 Q. Why shouldn't a business man set aside out of his earnings an ample sum to provide for unforeseen and unpredictable contingencies, such as the earthquake and fire of 1906 and the necessity for the complete reconstruction of his plant due to a revolutionary invention?

A. Limiting your question now to the installation of gas property, Mr. Bosley?

Q. Yes.

A. Taking it in the ordinary business, it is especially true of a man who does as he pleases and grows wealthy in the operation of it, and his wealth enables him to take care of anything of that kind. In a regulated utility he cannot do that. Your question is, Would it be prudent, would it be wisdom—

Mr. Bosley: Just read the question, Mr. Reporter.
(Question read by the reporter.)

Q. (Continuing:) In order to make that fund adequate he would have to set aside very large amounts, wouldn't he?

A. He would have to set aside a very large amount. I think, to reply to your question, if you are confining it to an operating gas works, I would say that the principal reason why he would not do that would be that it would entail the need of such a high price for his commodity that his opportunity for selling it would
744 be greatly curtailed.

Q. And very likely it would result in his being subjected to regulation that would cut down his rates to a point where he could not make any such provision?

A. As far as that is concerned, I am satisfied that, going back again to our friends, the Railroad Commission, that if you would present that proposition to them they would not consider a contingency of that kind for a single second.

Q. Now, Mr. Lowe, under those conditions, let us take now the case of an invention which results in very greatly diminishing the cost of the production of gas, so that if the new apparatus is installed and put into operation the cost of production per thousand cubic feet will be very materially less than under the previously existing method, would you think it wiser now, as a matter of business policy, to keep the rates higher before the new invention was in effect in order to build up a fund to provide for the obsolescence of the plant, or, after the obsolescence had occurred, to reduce your rates more slowly in order that you might provide for the amortization of the loss of capital caused by the abandonment of the obsolete property?

Mr. Searls: What length of time do you predicate the notice of invention on?

745 Mr. Bosley: I am not limiting that to any time; say a reasonable time.

A. If I understand your question, Mr. Bosley, my answer would be this: That I would expect at all times to be permitted to earn a fund over a reasonable period to amortize my existing property value. Now, that has nothing at all to do with the new invention; the fact that there is something new coming along which might make that valueless is not to me a factor. When the new invention came along I would expect it to be of such great advantage to me that the additional earnings, the extra earnings, from this operation, would enable me to pay for that invention within a reasonable length of time, and if I had not yet amortized, or had the opportunity of amortizing the previously existing apparatus, to amortize that as well from the proceeds.

Q. That does not quite answer my question. What I want to get at is your opinion as to the better course to pursue. Suppose you had it open to you to adopt either one of these two courses: First, keep your rates high enough during the existence of the old plant and before the new invention was made so that you could provide a fund sufficient for the amortization of the capital invested in the old plant before the invention came along; and on the other hand, you were satisfied that after the invention was made you
746 could either keep the rates where they were or reduce them somewhat and keep them above the cost of production for a long enough period to enable you to provide the fund for the amortization of the old plant that would be abandoned by reason of the new invention, which course do you think would be the more advisable?

A. That pre-supposes that an invention is going to be made and you are going to finance yourself in advance.

Q. Well, say that you did not actually know about it at the time; but let us assume now that you did have the gift that the ordinary man has not, the gift of foreseeing that an invention would be made at a certain time, and you were managing your property, which course do you think would be the wiser one to adopt, to keep your rates high enough while you had the old plant in use and thus diminish the opportunity of sales, to some extent, so that you might provide a fund for the amortization of your old plant before the new invention would be made, or, on the other hand, you had the opportunity of doing business while the old plant was in operation on the basis of that plant, and then of keeping your rates up to a reasonable extent after the invention was made until the value of the abandoned plant should be entirely amortized, which do you think would be the better course?

747 A. I am afraid I don't understand your question. Were I the seventh son of the seventh son and had the gift of foresight, and knew that an invention was going to take place that was going to hit me a hard swat—

Q. Let us assume that you are going to make an invention, so that nobody is in the position to take advantage of you.

A. I think I would be just exactly in the same position if I made the invention for myself as though somebody else made it for me

so far as that is concerned, I think I would be two individuals, one the utility and the other the inventor, I would have to separate myself under those circumstances. Now, manifestly, if I knew that something was going to occur that was going to require a large expenditure of capital, I would build up in anticipation of that.

Q. You would want to have a surplus?

A. I would want to have a surplus, yes, if I knew that some unforeseen thing was going to occur. Of course, I don't call that building up a fund in anticipation of amortizing that which we know is going to occur. This is merely a happening, it is something that may or may not come. I don't think I would build against that, any more than I would against an earthquake.

748 Q. Perhaps I can get at it in a slightly different way.

Let us assume now that you were in the position of the consumer, would you think it better that while the old plant was in use the rates should be kept high enough to provide for this complete amortization of the old investment, rather than have them reduced to a point where they average an adequate return on that, and then at the time that the invention is made have the rates reduced somewhat but still not reduced to the extreme low level where it would average only a return on the new plant?

A. If I were the average consumer, Mr. Bosley, I would want you to tell me that gas just as low as I could get it, whether you made anything on it or not.

Q. And you would want it as low as that all the time, wouldn't you?

A. Yes, I would, and I would not care whether you lost or made money. If I were not the average consumer, if I were the exceptional consumer, and the one who knew that, if you did not get a fair return on the money you had invested in your property, I would not long be able to enjoy the benefit of your service, then I would take a totally different view.

Q. Which course, then, do you think would be the better to take, to keep the rates high while the old plant was in use, or to let them stay up for a while after the new plant was put in?

749 Mr. Searls: What do you mean by "a while"?

Mr. Bosley: Sufficient time to amortize the old plant.

Mr. Searls: Fifty years?

A. On the assumption that the improvement was going to effect a great saving, then I should want the rates to remain where they were, unless, in justice to the consumer, the company could, in addition, through this large saving, reimburse itself and also make an allowance to the consumer in the way of a reduced rate.

Mr. Bosley:

Q. Is it not your experience, Mr. Lowe, that each new invention has to justify itself through the savings effected in order to secure its adoption and use?

A: Oh, surely.

Q. And a new invention is not adopted and made use of on the basis that individuals have accumulated a fund sufficient so that they may afford to abandon their old property and adopt the new?

A. No, never.

Q. It has to be offered the owner or the manufacturer on the basis of showing him that by the use of this new invention he can effect savings sufficient to make it worth his while to abandon his
750 old plant and put in the new; that is the actual business experience, is it not?

A. That is the actual fact and that is the actual business experience. As a matter of fact, it strikes me this way: That if a utility is adequately serving a community at a reasonable rate and then a new invention comes along which necessitates the expenditure of a large sum of money, the utility should be allowed to enjoy the existing rate until it has amortized its old property that is then in process of amortization, and also pay at least partially for the new property if not wholly.

Q. If any other course is pursued, would it not have the effect of making the owner of the plant very reluctant to adopt the new method?

A. Yes, unless there is some chance of gain he is certainly not going to trouble himself to benefit the public.

Q. Now, there is only one other matter, Mr. Lowe, that I want to get your views upon. I think you expressed the opinion that a public utility which was unfortunate enough to have property destroyed in the earthquake and fire of 1906, or in any similar case, ought to expect to stand its loss the same as other individuals in the community.

A. Those are not exactly the words I used; I think those are the words that Mr. Searls used, but that is what I believe.

751 Q. That is about what you believe?

A. Yes.

Q. In the case of the ordinary individual who is not subject to regulation, is there anything to prevent such individuals from recouping their losses by making extraordinary profits, if they can?

A. Nothing in the world.

Q. Do you think it would be quite fair treatment on the part of a regulating body having the power to regulate rates to say that the public utility having suffered a large loss from such a catastrophe as the earthquake and fire of 1906 must thereafter charge rates that were only sufficient to afford a return on the property that it had left, and that it could not, notwithstanding the fact that the traffic would bear higher rates, charge enough to enable it to recoup or reimburse itself at all for the great losses that it had suffered?

A. That introduces two very interesting elements; one of them is the company, the other of them is the consumer. Taking only the company's view, I would say that they would be very unfairly treated if they were not permitted in some way to recoup themselves for their losses; taking the consumer's view, I would say, Why

752 should the utility expect me to pay a portion of its losses, any more than I would expect that utility to pay me if I lost heavily by some disaster and it did not.

Q. Suppose the public utility did not ask the consumer to pay any part of its losses, but merely asked to be permitted to charge a reasonable rate for the commodity or service that it furnished to the consumer, and to make a little higher profit, possibly, than an interest rate upon its capital then in use in order that it might, to some extent, reimburse itself or recoup the loss that it suffered; suppose now that the rate charged is to be no higher than is reasonable under existing economic conditions, could the consumer justly complain if the utility were permitted to make up for its extraordinary losses?

A. The first part of your question, Mr. Bosley, offsets the latter part of it. If the consumer is to pay a fraction of a cent higher for his gas because of that loss, he is paying for those losses.

Q. Is he so absolutely?

A. What is he paying you for.

Q. He is paying for whatever it may be.

A. It does not make any difference what it is. The consumer of any product, whether it is gas, or the clothes you wear, or anything at all in the world that is consumed, the consumer pays for it.

Q. The consumer pays for the commodity.

753 A. He pays for the commodity, yes, and the commodity, of course, consists of all of its elements.

Q. Does the consumer, by purchasing gas at a price which yields a profit to the gas company, by that means purchase an undivided interest in the gas plant, or in the stock of the gas company?

A. He does not purchase it, he pays for it. He gets no title to it.

Q. What does he pay for? Doesn't he pay for the gas?

A. He pays for the gas, yes.

Q. And he gets the gas.

A. Yes, but that is the medium through which he pays for the property.

Q. And in the same way your clothes are the medium through which you pay the expenses of manufacturing, and the tailor shop, and the manufacturer of the wool, and the farmer who raises the sheep.

A. Absolutely.

Q. But you do not get any interest in the farmer's ranch, or the manufacturer's place of business, do you, because you pay an unusually good round figure for your clothes?

A. I do not; I get no more title to his property than he gets of mine for the service that I render him.

Q. But have you any just ground of complaint against the producer of the raw material, the manufacturer and the distributor, if
754 the price charged to you is a reasonable one, one such that the commodity that you get is worth to you what you pay for it?

A. From the gas company's standpoint, I——

Q. I am talking about this other case, now, the case of any com-

modity; I don't care whether it is gas, clothes, books, or anything else.

A. I do not think the price, Mr. Bosley, of any commodity is reasonable, if it can reasonably be less.

Q. That is from the consumer's point of view?

A. I think from any point of view. Now, in the first place—

Q. Aren't you coming simply to the proposition, Mr. Lowe, that in general, and in the long run, the reasonable value of any product tends to approximate the cost of producing and distributing that product?

A. Yes.

Q. And when you reach that state of equilibrium you have a perfectly reasonable rate, haven't you?

A. Provided it is only returning you an adequate return, that it is paying you an adequate return, a fair rate of return, whatever that may be—and of course I don't attempt to say what that is. I

755 have no sympathy with rate-regulating bodies that believe that you should go into business and continue to run the business for the benefit of the public and merely get a rate of interest out of it; you can get that without going into business. Don't understand me for a moment as saying that I believe in

hammering down prices. I don't. We are wandering a little from the subject now in discussing that vast problem of economics. When you get on that, I do believe that everyone, whether it is a gas consumer or whether it is your clothing bill, your wood, coal or food, no matter what is it, that you should have it at as low a price as you can possibly get it and yet give the other fellow a fair rate of return, whatever that fair rate may be.

Q. And the purpose of that fair rate of return is to induce the other fellow to produce and distribute the material?

A. To produce it and to provide you with it, yes.

Q. That is the whole theory that underlies exchange, is it not?

A. Yes, certainly.

Mr. Bosley: No further questions.

Mr. LOWE then testified, on redirect examination as follows:

In connection with the subject just discussed: Where you have an unregulated commodity—the keeper of a grocery store, 756 for instance, who had lost everything in the big disaster in 1906, I doubt whether he could come back and recoup himself out of the business in the future. The question of competition enters there. In other words, a man could come in from Sacramento, or from Stockton, or some other place outside, where he had not suffered a loss. I don't think you ever recoup yourself from a loss; we say we do, but we don't; if we had not had the loss we would have that much more.

Oil gas first became commercially feasible in Southern California in 1887. My first plant was installed in Northern California at Chico in 1899. In 1899, if the San Francisco Gas & Electric Company had come to me, it would have been commercially feasible for

it, at that time, to have acquired oil gas patents and installed oil gas works in San Francisco. In fact, I strove very hard to sell them my patents and tried to induce them to put in the apparatus, but without success. If they had had the same confidence that I had in my invention at that time, oil gas could have been installed in San Francisco probably six years ahead of the time that it actually was. Since oil gas was a commercial proposition in 1887 in Southern California, and had been actually installed in Chico in 1899,

757 and its feasibility for use in Northern California demonstrated, I would say that the San Francisco Gas & Electric Company was not, during these years, in the position of a company that had been suddenly hit with a new invention, and had no opportunity whatever to provide for the eventual amortization of capital used in other less profitable processes. If that company had what I would call ordinary foresight, it must have seen that it would either have to adopt the oil gas process or it would have a competitor that would drive it out of business. It would follow, then, that if the company did not adopt the oil gas process when that first became evident, that they could, if they wished, with reasonable prudence, have made some provision in advance in the way of amortization to be ready to meet this new process when it should become imperative for them to adopt it. It was there and was a menace if they chose to regard it in that light. They could make the provision, assuming, of course, that their earnings were sufficient to permit of such a fund. If they did not have the money they couldn't do it.

758 Mr. E. C. JONES, recalled for plaintiff, in rebuttal, testified as follows:

Q. Mr. Jones, have you made any study of the testimony given by Mr. Ellis concerning the depreciation of the gas properties of the plaintiff in San Francisco and the exhibits connected therewith, for the purpose of considering whether or not there is any basis for assigning definite lives to the different parts of the plaintiff's plant, so far as the physical conditions of those parts are concerned?

A. I have.

Q. Have you embodied the general results of your study of that subject in a written statement?

A. I have.

Q. I will ask you to read that statement?

A. Witness (reading): "A Statement concerning the Unlimited Life of the Physical Properties of Gas Plants.

"As an operating engineer I am not in accord with the prevailing custom of establishing the value of a gas plant by the age of its various parts. This subject was touched upon in testimony which I gave in this case as recorded in Vol. 17, pages 1126 to 1202½, and Vol. 18, pages 1203 to 1256.

"I would like to add to this testimony a few statements resulting from experience in the construction and operation of gas plants covering a period of 41 years, which is more than the allotted life

period given by engineers to the greater part of the physical properties comprising a gas plant. The natural substances of which a gas plant is composed if properly protected will last forever. Brick and stone may be given an unlimited life because they are not subject to the ordinary wear and tear. Wood, iron, and the other

759 metals when well protected from the elements also have an unlimited life and every part of a gas manufacturing and distributing system is composed of one or more of these substances, and the only agencies which may bring about their deterioration or destruction are casualties or neglect. If metal surfaces are properly protected by paint they are not subject to the action of corrosion and the only deterioration is that which affects the coating or paint. If the joints of masonry structures are worn away by erosion the structure may be restored to its original condition by pointing the joints. If for some reason the protective coating on any structure partially fails to the extent that corrosion may affect a sheet of metal in a building, roof, floor, or any of the steel apparatus to a point where it is deemed advisable to replace the affected sheet, this may be done and a rotation of painting and replacement of sheets, known as maintenance and renewal will keep such structures in a condition nearly as good as new.

"I use the word "nearly" for the reason that it is possible to so protect metal surfaces against corrosion that they will last forever, and it would then become unnecessary to replace any parts of the structure, but such a perfection of maintenance, however, is never practiced because of the human element which enters into the care of all physical properties, nor is it advisable from an economic standpoint.

760 "Metal surfaces are therefore subject to a slight deterioration to a degree of —lag—, which may be defined as the difference between perfect maintenance and that which has been found to be economically sound. This same practice of maintenance and renewals known as good housekeeping applies to the care and preservation of all physical properties used in connection with the manufacture and distribution of gas and the above described 'lag' will be found to exist in varying degrees in all parts.

"In the determination by an engineer of the present value of gas properties it is only necessary to ascertain the extent of this lag which is the difference in value between the plant when new and the plant in its present physical condition. This difference or lag I have estimated as existing in the San Francisco gas properties as appraised by me under date of June 30th, 1914, and set forth in plaintiff's exhibit No. 43, as amounting to 6.3% of the value of the appraised property leaving a present value of 93.7%.

"By reference to my previous testimony in which the details are given, it will be apparent that this lag only affects to an appreciable degree certain parts of the entire plant and that the value of the parts so affected is only a comparatively small percentage of the value as a whole and consequently there is nothing surprising in the result set forth in the last paragraph.

"It is my opinion that the property covered by said appraisalment has a service value equal to the full amount of the appraisalment and in estimating its physical value the age of the various parts of the property should not be taken into consideration because age in itself has nothing to do with the condition or value of the materials and different structures of which a gas manufacturing and distribution plant are composed.

761

Mr. Bosley: You may take the witness for cross examination.

Cross-examination.

Mr. Searls:

Q. Mr. Jones, how much of the original work of the San Francisco Gas Company, I think was the name of it, that first built the Potrero works, is still in existence?

A. I presume you refer to the Citizens Gas Light Company that built the Potrero Works.

Mr. Bosley: The City Gas Company.

A. The City Gas Company. I think nearly every building, the three gas holders and many of the other structures.

Mr. Searls:

Q. Just what other structures?

A. The old generator building, the purifying house and the purifiers, exist practically today as they did when they were constructed in 1872, and I think it would be safe to say that there is not a particle of steel left in the covers of these purifiers that originally existed. It is the rotation of maintenance and replacement, and deferred maintenance, in large units, parts of structures, that keeps them continually new.

Q. Why was the steel in the covers replaced?

A. Because in the maintenance of gas plants as I have tried to describe in this statement it is economically impossible to have a man with a paint brush on every sheet of iron in a roof or watching every shingle on a roof or keeping track of slight corrosion on vertical sheets of steel, so that there is a lag existing between the perfect maintenance and that which is economically sound; owing to that corrosion may get ahead of you so that it becomes necessary
762 or advisable to replace a part of a purified covering or a gas holder, and a rotation of such replacements keep the structure in a condition as good as new.

Q. And that is practically what is going on all the time in the plant?

A. All the time, yes.

Q. Take these buildings which you say exist as they originally existed. Haven't new roofs been put on any of them?

A. The roofs have been painted, repaired, slates have been replaced where broken or missing, and steel portions of the roof have been scraped and painted and protected in every way possible, and

the joints of the buildings have been pointed with cement, mortar, and as far as I am a judge, the buildings at the Potrero are in better condition today than they were new.

Q. It has however been necessary to make replacements of parts of the roof from time to time and possibly windows and other parts?

A. Very slight replacements, in the ordinary rotation; you are going back to my old story of the boy's jack-knife, a new blade this year a new handle next year.

Q. Those were all caused by the wear and tear of the elements, more or less, were they not?

A. That was the wear and tear of the elements, yes.

Q. What would you say with respect to the distribution system. Did you never have to replace any pipe at all due to electrolysis or corrosion or any reason?

A. Electrolysis in San Francisco is an over-rated casualty. As I stated in my previous testimony it hits the electric company harder than it does the gas company, and they have applied remedies
763 or preventatives to effects of the electrolysis so that its effect is almost negligible on gas companies throughout the country today, I find; as for the corrosion on the cast iron, I find that the opinion of engineers, which is proven by my own experience, is to the effect that cast iron in rusting due to the action of oxygen on the iron provides a coating of rust which is a protection to the iron lying underneath the rust. Now engineers seem to think that iron will corrode possibly one per cent in ten years. If we were to try to calculate the life of a cast iron pipe, you could possibly not place it at less than 1,000 years; I do not pretend to know how to do it, because I know that the gas pipes of cast iron, of all sizes, from three inches up, that were laid in Boston by my father in 1852 are still in a serviceable condition and are supplying gas to the consumers.

Q. Are you prepared to state that there have not been replacements of any sections of those pipes?

A. Surely, there must have been replacements made of sections of the pipe, for various reasons, and that I consider is the ordinary rotation of maintenance and replacement.

Q. In San Francisco, with respect to your distribution system here, as a matter of fact aren't you constantly replacing a section of pipe here and there that has become broken or injured in some way which makes it not fit for Pacific Service standards?

A. I suppose you refer to what we know as leaks in our system; if we have a broken main, owing to the settlement of the street or some shock, due to a jar of a heavy truck, or something of that kind,
764 that I consider a casualty which must be insured against, in carrying on a business like ours. Now this statement of mine does not include casualties in ordinary maintenance and replacements but I call attention to the fact that casualties and neglect must be considered. Now if a piece of main is broken we immediately repair it in such a way that that part is stronger than the original main, and it means if one is going to attempt to give a life expectancy to inanimate objects, he must give the same length of life

to those repaired parts as that it originally had; it begins to live over again.

Q. It is a fact however, that you are constantly replacing these sections, is it not?

A. No, it is not a fact; we do not replace sections unless, as Mr. Ellis stated this morning, we remove pieces of wrought iron pipe on account of changes of grade——

Q. (Intg.) I was not referring to that. I am referring to purely physical deterioration?

A. We do not change cast iron pipe for that reason, and personally I have never known it to be done extensively at all.

Q. How about your steel mains?

A. Steel mains, unprotected, as I stated in my previous testimony, have a relatively short life, although I am not prepared to estimate the life of a steel main. In an exhibit which I prepared and read to the Court I said 20 years would be the probable life. I know of steel mains that have lasted over 20 years, and I know of steel mains that have been eaten away in a much shorter period, but I explained to the Court a new method of protecting steel mains which we are now using, and I believe that with that protection a steel main
765 will have unlimited life, and if it is desirable to see how we protect these mains and the care that is used in their protection so as to insure unlimited life it is only necessary to go down the Highway where we are laying an eight-inch steel main from Baden Crossing to Redwood City, by going down there today you will see every process of it, the opening of the trench, the welding of the steel tubes, the coating and the wrapping, and the outer coating and covering up of the pipe.

Q. During the years from June 30, 1914 to June 30, 1916, were all your steel mains in the City and County of San Francisco protected with that coating?

A. No, none of them, Mr. Searls. Many of the steel mains,—all of the steel mains were protected by an asphaltum paint, but none of them as I remember it were wrapped. That was a method that we found out about afterwards.

Q. During those years did you have to replace any sections of those steel mains?

A. Not that I know of, no.

Q. In the course of probabilities you would have to replace sections though if the corrosion had kept up?

A. If they had become corroded so that they leaked we would have to repair the leaks.

Q. They might have become corroded so that you have to take up entire sections of the pipe?

A. But they did not.

Q. Are you prepared to say that they will not?

A. No, I am not, because I believe that they are not well enough protected; if they were protected by coating such as we use
766 today I would say yes, I would give them an unlimited life.

Q. Now Mr. Jones, taking these sections of the plant which you have testified must be replaced from time to time, to

keep it in 100 per cent service condition, that all costs money, doesn't it?

A. Most assuredly; everything costs money; it is simply a question of how much money will provide for an adequate maintenance and replacement and deferred maintenance and deferred replacements.

Q. If it were only going to be necessary to make those replacements on an average of say every ten years and you had a brand new plant today, you would not have to spend the money for ten years, would you?

A. The same thing would apply to the cleanliness of a man taking a bath every year, whether he would take a bath every year for ten years, or take ten baths in one year. It would have the same effect as a coat of paint on your house in the city, to keep it up, it is a portion of good housekeeping.

Q. Well, now I am assuming just the kind of house-keeping that you have kept up on your plants; you can call it good house-keeping or poor house-keeping, but we will say that the same kind of care and maintenance was given the plant that you gave yours, and that notwithstanding that it would be necessary at the end of ten years to replace a roof here or some steel sheets here or a section of steel pipe there. Would you still have to figure on spending that money at the end of ten years from the time you started with your plant new?

A. Yes, Mr. Searls, I liken it to this: We will suppose that
767 a man has an ordinary income which he must expend for living expenses, and that is his maintenance; now he is going to protect his family by having a life insurance policy on which he must pay a premium say every six months; now a thrifty man will lay aside a little bit of his income every month, so that at the end of six months it is no hardship on this man, he has the money to pay his premium on his life insurance. Now an engineer with the same degree of thrift and prudence will look forward and see a piece of deferred maintenance; it may look large to a lawyer, but it does not look very large to a gas company; it may be a gas holder, it may be top of a purifier, it may be a roof. As a unit it is large, but when it is spread over the history of ten years of a gas company it hardly puts a notch in the load line of maintenance and replacements.

The Master:

Q. Isn't that what Mr. Ellis is trying to do?

A. I don't know your Honor. As I look upon it, the present method of depreciating property in order to arrive at a conclusion of how much shall be set aside to care for that property, to maintain it and take care of replacements, it seems to me to be confiscation instead of depreciation.

Q. Yes, but as a matter of mathematics Mr. Ellis might reach substantially the same result. There is a discrepancy there that I called attention to—by simply establishing a sinking fund that you call life insurance?

A. Yes, that could be done, but I believe the best way of doing it is to take the books of the company and find out over a period of years how much money has been necessary to maintain the
768 plant, to take care of replacements and add to that the risk of casualties which we must know take place in a gas plant sometimes, like accident insurance with a human being—if we do not have an explosion or fire loss this year there is no reason why we should not protect ourselves against the casualty next year of fire or explosion.

Mr. Searls:

Q. Or if you know that the Independent plant down here has got to be discarded within three or four years there is no reason why you should not protect yourself against that emergency, I suppose?

A. If it is economically possible—if it is possible to do it, surely it should be done.

The Master: You are going to discard these generators in the Independent plant when you get your two new generators of the Jones type?

A. That is the plan. We use the best reasoning methods we can employ to find out what we think we will do in a year or two; Mr. Ellis has referred to a table which I prepared showing the expected development of the plant; along comes a war, up goes the cost of material, it becomes impossible to get things, and it upsets the whole plan; we cannot live up to the promises of that chart; we are constructing two generators at the Potrero; what is the status of them? The foundation is in, everything that we can do is in, but no steel work; we don't know when we will get it. We have got to hold on to the Independent plant until such time as we are permitted to start the two new sets.

Mr. Searls:

Q. Let us go back to the time when there was not any war, so far as this country was concerned, and talk about the plant as it was. Now taking the plant that you had newly built and
769 on which it would not be necessary to make any replacements for ten years; now as you say it might be very good foresight indeed for the owner of the plant to set aside each year an amount which at the end of ten years would take care of his replacements. I think you agree to that, don't you?

A. Mr. Searls, we do not quite look upon replacements in the same way. I want to convey the idea that we do not wait ten years, nor do we make extensive replacements; that leads you off into another field which is not covered by this statement at all; I have tried to avoid any reference to obsolescence or inadequacy. This is maintenance and replacement.

Q. I am avoiding any reference to obsolescence or inadequacy in my question, Mr. Jones. Assuming that you have a new plant that due to wear and tear of the elements, which have a certain effect upon

the steel covers to your purifiers and the roofs to your houses or buildings, and some of your steel mains, in spite of the normal house-keeping that your company has followed, at the end of ten years it is going to be necessary to replace certain portions of that plant. Now, I think that assumption is in accordance with the statement which you made, is it not?

A. No, it is not. I do not understand it so,—not with a rotation of the maintenance and replacements; we are not going to have any periods of expirations of parts of the plant.

Q. But if you had a brand new plant which you were just starting out with, a plant which was today just as it would be reproduced, and your first replacement was 10 years away you would not have to worry about actually making that replacement until the 10 years were by, would you?

770 A. No, but we do not replace parts of a unit in that way; the replacements are made daily. We do not let things go down to the breaking point and then replace them. I can imagine a steam engine—that may be used as an example in place of a gas works—I can imagine that a steam engine with proper maintenance and replacements and additions would represent a gas plant including maintenance, replacement, adequacy and obsolescence; that is you could add improvements to a steam engine as it came out; you could replace worn or broken parts; you could maintain it with paint and polish, and that engine if it is properly maintained and the worn and broken parts are replaced, and there are additions to keep it modern made to it,—I can imagine that that engine would have an unlimited life, and be always within a certain lag, or a small percentage, say anywhere from three to six or seven per cent as good as new at all times; and in treating that engine we would not wait until the deterioration had become pronounced.

Q. I am not assuming that the deterioration is so pronounced that it is going to affect your service. I am assuming that at the end of 10 years it is going to be necessary for you to make certain replacements of fundamental parts of your plant?

A. No, I do not admit that. We make them all the time.

Q. If you had a new plant you wouldn't?

A. Yes, you have got to keep it new. If a man owns a house in this city he must make up his mind to paint his house at periods, say two-year periods, and to set aside money to paint it; if he is not a prudent man and waits until the house needs painting, until
771 it shows the visible effect of wear and tear, then his house is going to deteriorate, and we are going to make good the claims of Mr. Ellis for depreciation; we are going to have a worn out gas works after a while and dead parts of it; but it is not necessary in maintaining physical property to have this lag, as I call it, exceed a very few per cent below new.

Q. Notwithstanding the fact that the man paints house every two years at the end of a certain period of time he will have to put a new roof on it won't he?

A. The house of my great-grandfather who was born in New Hampshire never had a new roof on it, and that was built in the

eighteenth century. I do not believe they have taken much pains to keep it up. We do take pains in keeping our roofs up.

Q. Are you prepared to say that the general experience of householders is that they never have to put a new roof on their houses if they paint them every two years?

A. That should be the practice in maintaining public utility properties.

Q. That does not answer my question.

A. What is the question.

Q. Read the question.

(Last question repeated by the Reporter.)

A. Not if the City of San Francisco would permit them to make fractional repairs as we make in the gas works.

The Master: Mr. Jones, I remember seeing over in Berkeley a length of water pipe; I think when it was put in it was probably a cheap class of sheet iron tubing or sheet steel tubing, and I suppose from time to time there might have been repairs, but there
772 finally came a time when leaks kept breaking out here and there all along the length of the pipe, perhaps two in a block, perhaps in different blocks, and finally the water company concluded the pipe had gone and they gave it up and then they had a controversy with the city as to whether they had to take it out or let cave in, and the cause is pending. Now there is a case—not a case of cast iron,—it was a case of uncompletely protected pipe—if they had needed that particular line I should surmise that they would have had to take up the whole length of several miles of pipe and replace it with new pipe, wouldn't they?

A. I think they would, your Honor, because on account of not being perfectly protected the pipe had a limited life, and an engineer should know that provision should be made for replacing that pipe; the replacing of this pipe of course means no more to me in considering a deferred replacement of a physical property than it would to put a coat of paint on a generator. It is a large item in dollars; that is all it amounts to.

Q. Exactly. You and Mr. Ellis would be in perfect accord on that point as I understand it. No amount of good housekeeping in that particular case would be of any avail?

A. Not after the mistake has been made originally in not protecting the pipe. We have some pipe in San Francisco in practically the same condition, poorly protected steel mains which I believe won't last more than 20 years; I gave them that life really against my own best judgment, because I find that the longer I live and the more I
773 work in the gas business the less able I am to determine the life expectancy of physical properties.

Q. Now, to get back to the question of cast iron, I understand Mr. Ellis in my questioning of him this morning to lay the blame for any limitation of life upon factors other than physical depreciation. There would be the case of accident, but there again there is a question of whether you throw the cost of a single length of cast iron pipe replaced into reserve or into the operating account; but in

the matter of the four-inch main which is the largest element in the valuation, as I remember, of cast iron pipe, as he has figured it there, he gave a shorter length of life because of the greater operations of the factors of inadequacy and obsolescence—no obsolescence at all, but inadequacy. That would mean I presume that the service conditions would very frequently require the removal of four-inch mains. Does that accord with your understanding?

774 A. There is very little of it removed. We make the dividing line at three inch and under. I know for a fact that in many of the Eastern cities there are four-inch mains laid between 1852 and 1860 that are still in use and still give good service for the reason that a four-inch main properly supplied with gas from both ends will take care of an ordinary short block with all the development of business in the way of water, heating and fire-places, grates, furnaces, etc.; and if a system is blocked out like a gridiron of four-inch mains and is properly fed by feeding mains at different intervals through the system, those four-inch mains never become inadequate. I tried to argue the matter with Mr. A. M. Hunt at one time when I made the flat statement that it was impossible for a gas-holder to become obsolete or inadequate, because it was only necessary to add another unit to double its capacity or treble it and so on, to keep up with the growth of the business; the same thing applies to a gas main unless it is too small a main in the beginning. A three inch cast iron main is structurally weak; a three inch cast iron main is I consider a little bit too small for the ordinary blocks such as we have in San Francisco, unless you can put high pressure on, and you cannot put high pressure on three inch cast iron mains to any extent.

Q. I remember going out here on Market Street one day not long ago and I saw what I took to be gas pipes of possibly about four inches diameter; I do not think they were above that; they might
775 have been three inches, being removed right along here.

A. I don't recall that particular case, but they might have been in the way of something else, an electric conduit or some improvement of the city, that often of course takes place.

Q. Now, what I want to know is whether in the history of your company there are statistics which will show that the four inch cast iron mains have been removed in considerable quantities?

A. No, there is no such a history in any company.

Q. You remember that, as I understood Mr. Ellis, he based his figures on a study of the company's history of the replacements. You would not agree with that statement?

A. I could not agree to that. There have been replacements of two inch wrought iron mains or steel mains and two inch and three inch cast iron mains, they have been practically eliminated from the gas business, they are structurally weak; but the four inch is a standard size main all over the country for distributing gas in small blocks, I never have considered it as possible to become inadequate unless you put up a great many apartment houses on the block and then it becomes necessary to add another main or a larger one or increase the pressure or put in high pressure and feed into this smaller main

—there are many ways of improving the service of street main systems without disturbing any of the original investment, that is, by building up on it instead of destroying it and taking it away. That is the history of the distribution of gas of the world. In speaking of the age of cast iron mains, a friend of mine took out some ten inch cast iron mains in Manchester, New Hampshire a month ago, which had been in the ground for 65 years, and he said that it was as good as when it was laid,—so far as he could see—of course he was not 65 years old, this man, but an examination of the iron showed that there was only the surface coating of rust, and he said he was going to lay that pipe again as new pipe. I never have been able to see how a man could determine the difference in the life period or expectancy of life between the different sizes of mains, unless you go down to the three inch, where it is structurally weak, or inadequate on account of size, carrying capacity.

Q. That is what I understand Mr. Ellis made his division on?

A. He made it on four inch or three inch?

Q. He made it as between the larger pipes on the question of inadequacy entirely?

A. But I have never known of a large main to be taken out on account of inadequacy.

Q. He practically gave it unlimited life?

A. You add to it, you know.

Q. The largest mains, he gave them 100 year life; he might just as well have said 200 years life?

A. I believe that would apply equally well to a six inch pipe.

Q. His smallest size is three inch?

A. Yes, because the two inch was given up years ago.

Q. He made three inch 25 years, 4 inch 35 years, 6 to 8, 40 years, 10 to 18, 60 years, and 20 to 30, 100 years. When you get into the hundred years, of course, as I say the difference in the mathematics there is such that he could as well have made it 150 or 200 years and it would not have changed the result?

A. With the replacements and maintenance I do not see why six inch main should not be given a life expectancy of 1,000 years.

Q. What maintenance do you give to mains?

A. Such repairs as leaks or weakness; it is a casualty. After the earthquake we were compelled to take up the joints all over San Francisco and re-caulk the lead in them.

Mr. Searls: Mr. Jones, is it not a fact that with the growth of the apartment house district in San Francisco it was necessary for you to lay larger mains where you had four inch mains in?

A. No, we have not done that; we have added another pipe in places; we have substituted a great deal of four inch and six inch pipe for two inch wrought iron pipe, Mr. Searls, but there has been no great exchange of pipe sizes in San Francisco on account of the growth of the business; it has been an addition of pipe.

The Master: Let me ask you again: Is that wrought iron?

A. No, your Honor, it is steel.

Q. Was that of a class to which you gave a 20-year life?

A. Yes. I didn't know what else to do with it, but I don't know whether it is 20 or 30 or 10.

Mr. Searls:

Q. Mr. Jones, you appreciate that Mr. Vincent and Mr. Ellis made a study of this particular problem from the records of the company, don't you?

778 A. I appreciate the fact they made a study of it.

Q. Did you make a similar study from the records of the company to determine just the amount of each class of pipe that had been discarded?

A. Not a specific study, no, I did not.

Q. Was it your son Mr. Leon Jones, or was it yourself that sat in with Mr. Vincent and Mr. Ellis and reviewed this entire question?

A. I sat in with them on it, but I have never been in sympathy with it. I have never changed my opinion on the maintenance and replacement of gas plants since 1876 when I went into the business; I have never had reason to change my opinion, and I find that other opinions are changing to be like mine now.

Q. They submitted this table of lives to you for your consideration and comment, didn't they?

Mr. Bosley: Just a minute, Mr. Searls; Mr. Ellis' testimony was that they submitted certain parts only. If you will refer to pages 3034 and 3025 you will see what Mr. Ellis said was submitted to Mr. Jones.

Mr. Searls:

Q. Let Mr. Jones answer what they submitted to him?

A. They submitted a mortality table to me, and I could not agree with them. They asked me what I thought of it, and I said the lives were too short in many cases; that was simply an opinion expressed with a belief that they were going ahead with a doctrine, a theory of depreciation, and I was given to understand that the shorter the life

779 of a unit the better it was for the gas company, to get a higher percentage of premium or something of the kind—that is, if you could make the units of your property shorter lived you would get 100 per cent, and if you did you would not get what it was worth—I didn't subscribe to any of the suggestions of that kind.

Q. You thought it would be advisable from the standpoint of chief engineer of the gas company to agree to as short a life as possible?

A. No, I did not. I didn't feel in accord with the doctrine at all.

Q. Didn't you suggest such changes to them with respect to the lives which they submitted to you?

A. To remove apparent absurdities, that is I did not want the child to die before it was weaned, and I believe they increased the life of some of these parts in order not to be absurd. I never subscribed to this doctrine of depreciation. In 1908 when I made the

first appraisalment of the San Francisco gas properties I was asked to prepare a mortality table of its different parts and I said I could not do it, I didn't know enough to do it, and I am in the same position today.

Mr. Bosley: Mr. Searls, on pages 3034 and 3035 of Mr. Ellis' testimony, it is to the effect a tentative schedule of probable lives of the stations proper or the generating plants were submitted to Mr. Jones and he suggested certain alterations in the schedule which were made. As to the distribution system he suggests on page 3035 and following that that table of lives was not submitted to Mr. E. C. Jones.

780 That was made up without getting his opinion upon it, a study partly by Mr. Vincent and by Mr. Ellis and partly by Mr. Vincent and Mr. Hunt.

Mr. Searls: With reference to the generator at least, Mr. Jones, you subscribed to Mr Bosely's statement there as being correct, that they did submit the table of lives to you and you suggested certain alterations in it which they made?

A. I don't remember whether it was the generating system or the matter of consumers' meters. As I remember it, it was a matter of consumers' meters, which again like the boy's jack-knife—I will have to repeat myself in saying this, but the first dry meter that was ever made in this country was in use up to a few years ago, and is now in as good condition as the day it was made in England, and is on exhibition in England.

Q. Is it not a fact, Mr. Jones, that you knew that Mr. Vincent and Mr. Ellis were desirous of getting at a basis for figuring annual depreciation allowance of the company and when they came to you with this table of lives you did sit in with them and give the matter earnest consideration and recommended such changes in the schedule which they had submitted so as to make the allowance which they were to arrive at for those particular items which you reviewed more nearly in accordance with what you conceived to be the actual facts?

A. No, I never carried it as far as that. I have never been in sympathy with that method; they simply asked me if I thought a certain number of years were long enough, as to a part of 781 the physical properties, and I believe I said,—I remember I said I did not think it was long enough. But I have never subscribed to that method. I never sat in on anything to find out how much money shall be used for maintenance and replacements by beginning at the wrong end.

Q. Wasn't this in effect what you said to them: Gentlemen, I do not believe in this theory because I believe that property should be valued on the basis of its service value to the company, or rather the thing should be handled on the basis of service value and service condition to company, and if you are going to use tables of lives then I suggest these changes: Isn't that the effect of what you said?

A. I don't remember what I said, but I know one thing, and it is like a man's creed, I have only had this belief since I have been in the business and that is service value under proper maintenance and replacement should be 100 per cent, and if an engineer wants

to find out a basis for the depreciation or deterioration of physical properties, it is the easiest thing in the world for him to go into the plant, and if he knows his business find out the present condition of that plant and he can tell whether a building has got four walls or three walls, or needs a coat of paint, but to stand off at a distance and take a table such as I furnished to these engineers, a chronological table of the ages of the different units and sitting in a man's office and telling what condition that plant is in, when it is going to expire, is beyond my ken; I don't know anything about it, and I don't want to.

Q. Mr. Vincent is an engineer who is fairly familiar with
782 your plant, isn't he?

A. I don't know how he got it.

Q. He has been employed by your company a long time for appraisal purposes?

A. I presume so.

Q. Is it not your understanding that both of these gentlemen had viewed the properties and made something of a study of their history and the replacements and so on?

A. I don't know anything about it; I don't know how extensive a study either of these men made of the plant.

Q. Did you ever make such a study with a view to determine the experience of the company with respect to the life of these various elements?

A. I tried to do it, but I have not succeeded; I tried to express my opinion in the exhibit presented to His Honor here showing the present condition of the property from an inspection.

Q. Did you ever take the statistics of the company with respect to the abandonment of different classes of property and try to derive from those some mathematical conclusions as to the probable lives of the various elements?

A. Only in a general way, because the changes in the art have been due to improvements that should be classed as not maintenance and replacements, but as obsolescence and maybe inadequacy, which I have not touched upon today at all. I have not considered it in this statement that I have made. The casualties which we have had, plenty of them in San Francisco, with our earthquake, have made quite a dent in the historical treatment of street mains and distribution systems.

Q. Are you then of the opinion that the experience of your
783 company would be no guide whatever to an engineer we will say who was seeking to determine physical deterioration?

A. I think it might be used as a guide if proper intelligence were coupled with it, taking into account casualties, earthquake, and other things.

The Master:

Q. Mr. Jones, do I recall your view properly when I say that your idea is that if a plant is in 100 per cent service value that it is worth 100 per cent for the purposes of sale irrespective of age?

A. I will say yes to that, your Honor. I consider that value might be defined as desirability. That is, a given plant is worth what a man will pay for it; that is, it depends on how much the purchaser wants the plant and is from a large figure down to as Mr. Ellis said this morning a negligible figure, where a scrap value might be a liability instead of an asset.

Q. Now, I suppose sometime these two splendid new generators that are down there at the Potrero station will be taken out or replaced by others?

A. If the art of making oil gas does not change, I can imagine that these same generators by a rotation of repairs and renewals might last indefinitely, but that is improbable, your Honor, on account of changes in the art.

Q. There probably will come a time when you will put in other ones?

A. An improvement. That would be obsolescence. It would be handled in an entirely different way from this housekeeping.

Q. Exactly, yes. But now suppose that you had reached
784 that period and that you knew that next week you were going to start to replace those two units with others, and the plant consisted of nothing but those two generators; you would not consider that it was worth the investment that they represented for the purposes of sale, would you?

A. If the purchaser desired the plant with its established business.

Q. I am leaving that out for the time being.

A. I have never been able to separate that in my mind, your Honor, because every gas plant I have seen sold has been sold for some excellent reason; that is, I have seen many gas plants sold where the stock has been sold away above the highest market value, for the purpose of acquiring a plant; there is some reason for buying a gas plant.

Q. Here is a plant which we will say consists of the two new Jones generators, and nothing else for the simplicity of the illustration, and they represent all told the value by reproduction cost or by investment, or any other way you choose to get at it with their established business of say one million dollars, and you told the purchaser those will go on making gas if we continue running them, but we are going to take them out next week. Would you figure that he would pay a million dollars for them?

A. Yes, I would. I have seen similar cases where a man would buy a well-established, say a milk route, or some business of that kind, where it was a question of a few leaky cans, but the established business with the other items, which are so much larger than the
785 generators, compared with the total value of the plant, like a distributing system and holders and buildings and everything else, would make those generators a negligible portion; he would say, we will say nothing about the leaky cans, we want your business; we want that milk route to go ahead with the splendid business we have, it is worth enough to us to pay for the value of the cans and not use them.

Q. That notwithstanding the fact that you would have to tell the purchaser that he would have to meet an expenditure next week of so many hundreds of thousands of dollars on those generators?

A. Yes.

Q. Well, suppose the same man had come to you in the second year of the life of that hypothetical plant, having those two generators and having that same established business, would he pay the same price?

A. All depending on the degree of desirability, that is how much the purchaser, prospective purchaser, wants the property, and what he wants it for; he might pay a higher price in the second instance. I have known it to be done.

Mr. Searls:

Q. You think it would make no difference whether he knew he would have to pay out three hundred thousand dollars or four hundred thousand dollars next week, he would not be willing to pay any more in one case than in the other?

A. I have known, Mr. Searls, gas plants,——

Q. (Intg.) Just answer that question?

A. Yes. May I qualify that?

Q. You think he would not pay any more in one case than
786 in the other?

A. I am mixed up. Let me have the question.

Q. Read it.

(Last question repeated by the Reporter.)

A. I don't quite understand that question.

Q. Referring to his Honor's hypothesis there?

A. On the hypothesis of his Honor?

Q. Yes.

A. No, I don't think it would make any difference.

Q. Let me suppose this condition: Suppose you were a purchaser of a plant and you had the opportunity of buying two plants in equally desirable localities, although they were separate localities, so there was no competition between them, and you could make your investment in one place in a plant which would not have to make any replacements for ten years, and in the other place would have to make a replacement next week involving an expenditure of \$400,000 in buying new generators, which one would you buy, other things being all equal?

A. Two plants in one community?

Q. No, two separate communities, equally desirable, in all other respects except that in one case you would have to pay \$400,000 to make a replacement the following week?

A. I don't know how to answer that question, Mr. Searls.

Q. It sort of answers itself, does it not?

A. I would have to fall back on Mr. Ellis' excuse this morning; it would depend a good deal on the fellow that wanted the plant, and I would have to know some other things too. I was going to

787 tell you about a case back East where a price was paid for a gas plant in excess of its appraised value; a very high price was paid for the stock simply for the purpose of closing out the plant and getting it out of the way.

Q. Yes, we have had some examples of that in San Francisco too. In order to get at your principle, if your principle is worth anything, let us take a perfectly simple situation and see whether it will work out in the ordinary course of human probability; I put a simple situation to you where one man was getting a plant where he would not have to make this replacement for 10 years and the other is making an investment where he will have to make this replacement in the next week, and all other things are equal. You do not have to consider any other factor. You are unable to state which one he would buy?

A. He would certainly buy the one that was most advantageous to himself. You can answer that question just as well as I can. I don't know. There are so many things that enter into that question Mr. Searls that you would have to answer it for yourself and I would have to answer it for myself. I cannot imagine a case of that kind, because I started in on this thing on the theory of keeping the plant in excellent condition all the time by maintenance and replacements.

The Master: That is all included in my question and Mr. Searls', the plant that is going to go out next week is in absolutely A-1 condition, so far as housekeeping is concerned, and you have found the time when you are going to take it out for one reason or another, presumably obsolescence.

788 Mr. Searls: Now let me take the other side, Mr. Jones:

You have two gas companies who own these plants, one of them has a new plant which it has just put in and will not have to be replaced for 10 years.

Mr. Bosley: Where there is no obsolescence, you mean, Mr. Searls?

Mr. Searls: A new and improved plant. The other one is in all respects equally desirable, but that next week these generators will have to be replaced, and the company who owns those obsolete generators, has during the past years accumulated a proper reserve for the retirement of their investment. Now, if they are going to sell this plant with the obsolete generators in it, is it not your opinion that in order to effect the sale, if they are willing to make one, that they would make some reduction from the original cost price of those generators in the light of the fact that they had accumulated their reserve for their retirement?

A. Wouldn't that reserve take care of all that? Wouldn't that be in the light of deferred replacements, and wouldn't the money represent the new generators in that case?

Q. But the man does not buy the money, he is buying the plant. He is not buying the money.

A. Doesn't the money go with the plant?

The Master: It all depends.

A. I should say it does.

Mr. Searls:

Q. I am assuming that he is not going to buy the money, he is just buying the plant.

789 The Master: He is not buying the stock, but he is buying the physical property.

A. The answer to that question would be a man would buy the thing that was most advantageous, the thing that was in the best condition, and on which he would have to spend the least money.

Mr. Searls:

Q. On the other hand, if the company made him such price on the obsolete generators so that he could afford to make the replacement next week, he might take up their offer and buy that plant because it would require no greater investment on the whole; he would buy so much plant less so much accrued depreciation, and add next week so much investment in new generators?

A. That depreciation would be wholly due to obsolescence, wouldn't it?

Q. Yes, and you would be satisfied that he would pay less under those circumstances?

A. You have got me kind of mixed up on this matter, and I don't know how to answer your question.

Q. I have tried to keep it very clear, so as to avoid any confusion.

A. They are hypothetical conditions that I have never known to exist.

Q. Well, now let us take a similar case with respect to physical depreciation. We have these two new plants in one of which, due to the lapse of years and wear and tear of the elements it will be necessary to make \$50,000 worth of replacements in new roofs for

790 buildings and covers for purifiers and sections of steel mains, and in the other due to the fact that it is new it will be unnecessary to make any replacements for a period of say ten years. Are you of the opinion that the man who was buying the plant would find the one in which he would have to make replacements immediately equally desirable with the one he would not have to make replacements for ten years?

A. No, but that is contrary to my theory of the care of gas plants. In the first place, I do not believe it is prudent for a man to wait ten years before he makes replacements. I do not believe it is well for the other fellow to let his plant run down and deteriorate—the element of neglect must not enter into this thing at all; he should not let a plant run for ten years before doing anything to it. We must keep it up as well as we know how, to a small percentage of perfect.

Q. Without considering the proclivities of either the buyer
791 or the seller for good housekeeping, we have a condition in the history of the two plants that we have been comparing at a given point where one of which, as a matter of condition, the prospective purchaser finds he would have to make considerable replacements due to the wear and tear of the elements in the past; in the

other case it is a new plant where he finds he will not have to make such replacements for ten years. Is there any question in your mind but that the second plant is the one which he would buy if he were paying reproduction value new?

A. Most assuredly not, if you will let me qualify my answer by saying that this condition could not exist with good housekeeping and proper maintenance.

Q. And conversely if he were to buy the plant where there were replacements that had to be made he would insist on getting a lower price for it than the other one before he would buy it?

A. He would have a right to do it on something that is allowed to run down, second-hand junk.

Q. Let us get down to the plant that you know about, the plant that is in existence, and that replacements are constantly being made, not being deferred for ten years, but right along, and every year there are so many thousand dollars spent for replacing this or that or the other items, I do not mean simply painting or caulking joints or what we term maintenance—you know the difference between maintenance and replacements—every year there are so many thousand dollars spent for replacement of certain parts of the
792 plant. Now, take a plant like that over a period of time, doesn't it reach an average condition which is less than 100 per cent value, no matter how good service it is rendering, merely because these replacements have to be made, with the constant lags, as you call it?

A. Yes, I have calculated that on our plants we keep them to within 6.3%, that is, the average condition, and the average condition will be higher than that in a period following this first period that I have calculated, for the reason that there is approximately \$189,000 of Martin station thrown into that first calculation which won't appear in the next one, and in that case if I should go over this computation again I would probably find that I had a valuation of something like 97 or 96%, if that goes out, Martin station, of the second computation.

Q. Getting away from the exact percentage, so far as the condition goes, the plant never would be at 100% value if it had been going for a number of years; the value of the plant, I am speaking of, that is, its worth in terms of money.

A. It is economically undesirable that it should. No.

Q. So then after all it becomes a question of determining how much should be set aside annually or must be set aside annually to take care of these replacements?

A. Most assuredly.

Q. And unless the purchaser was going to get this depreciation allowance thrown in with the plant when he bought it, unless he bought the stock and all the assets, he would insist on a deduction being made which would correspond to approximately the annual allowance which he would have to set up himself to
793 take care of those replacements.

A. I believe that if a dollar is set aside in a fund for performing a certain kind of work in a gas plant, that it should be segregated to

that purpose, and it should go with that part of the plant when it is sold; that keeps a plant new.

Q. One man's dollar is as good as another man's dollar?

A. Your fund should go with the plant. That is deferred replacement.

Q. One man's dollar is as good as another man's dollar, is it not?

A. I presume so.

Q. Does it make any difference whether the man buys the stock and takes the depreciation fund along with it, or whether he subtracts the accrued depreciation and puts it up out of his own pocket?

A. I do not follow you.

Q. Here is a book that I will give \$1 to replace at the end of four years. This is the end of the first year. I have set aside 25 cents to replace that book—setting aside 25 cents each year to replace that book at the end of four years; you come to me and say, "Mr. Searls, I want to buy that book." "All right, Mr. Jones, here it is." "But it is not new, Mr. Searls, I will have to replace that in four years." "Yes, I know that, and I have been setting aside 25 cents every year. Now I will make you this proposition, I will give you this book for 75 cents and keep the 25, or I will give you the 25 cents back and take a dollar." Is there any difference in the proposition?

A. Not in the way you state it, but if I was going to buy
794 that book I first would have to have a good reason for wanting it, provided I am not a second-hand dealer. In the second place, I would immediately make a personal appraisal of the book and find out its present condition and value, and that would upset your problem, probably.

Q. Well, that just depends whether I am right or you are right.

A. Absolutely, and I would use my judgment as an engineer in making an appraisal of the book in its present condition, depending on how it has been treated, and the amount of wear and tear on it, and that would determine its value to me, added to the reason why I wanted the book.

Q. You would also consider how soon you would have to replace the book, wouldn't you?

A. That would be a factor of the present condition of the book.

Q. Now, isn't that just what you do?

A. All I ask anybody to do in any class of work is to go there and look at it and find out what condition it is in.

Q. Isn't that what you do in a gas plant when you make an intelligent appraisal of it for sale or purchase, you determine just how soon in effect you have to make the different replacements; in other words, what is the probable expenditure required, and you figure it will take so much money to make those replacements at that time, and then you determine its present worth in the light of those assumptions. Is there anything impracticable or impossible about that?

A. Nothing whatever, that is exactly what I have done in this Exhibit 43 in connection with the appraisal of the physical
795 properties which was a reproduction value new. This sets forth the present condition of these properties, gives its percentage of value as compared with the reproduction value new.

Q. Without going into all of that again—I would suggest that you do not go into that, because you did not consider in your appraisal the time at which various portions of the plant would have to be replaced.

A. Because I didn't know that, Mr. Searls; I am of the opinion that the changes in the art due to improvement should be taken care of in another way entirely.

Q. But with respect to physical deterioration alone, I suggest to you that you did not include in that study the question of all the physical deterioration which would have to be taken care of by replacement within that time.

A. It was covered by a figure, I think it was \$75,000, which should take care of the replacements, the sheets in the generators, scrubbers, and everything excepting casualties—as the maintenance and upkeep of all generating plants \$75,000 annually, and in my judgment that is sufficient to do it.

Q. You also took up the question of cost of repairing meters, didn't you?

A. I did.

Q. You did not take into account the cost of replacing meters, however, did you?

A. I did.

Q. Where?

A. In this column here, "Replaced and Abandoned Meters."

Q. \$27,000?

A. Which I found over a period of years was sufficient for the replacement of abandoned meters and meters destroyed.

796 Mr. Bosley: I think the only point of difference between Mr. Ellis' treatment of physical depreciation alone and Mr. Jones' treatment of physical depreciation alone is that Mr. Jones does not admit that age, as a factor by itself, has anything to do with the problem. He says the physical condition governs, because the things to be valued are of indefinite duration when properly protected and cared for and maintained. I think that is the only point of difference, so far as the two are concerned in their treatment of that.

Mr. Searls: I don't think we have made any claim on the basis of age alone. We are dealing with a practical problem, not with a piece of pipe in a glass case. The age and wear and tear of the elements are inseparable. I think Mr. Jones' cross-examination on that exhibit pretty clearly indicates what he did. I have no desire to ask anything further at this time.

797 N. B.—The subject of depreciation as related to obsolescence and particularly the question whether losses of capital occasioned by obsolescence should be provided for in advance by the creation of an obsolescence fund or should be amortized out of savings effected or profits produced by the use of new inventions were discussed by Mr. C. E. Grunsky, the substance of whose testimony upon this subject is contained on pages 837 to 845 in this statement, and by Professor Fred Rogers Fairchild, the substance of whose

testimony upon this subject is contained on pages 1506 to 1507 of this statement.

The subject of depreciation in relation to the present value of plaintiff's properties and also in relation to the cost of manufacturing and distributing gas is dealt with by the Master on pages 33 to 80 of his printed report. The Master, for the purpose of determining the present value of plaintiff's gas manufacturing plants and distribution system and the reasonable annual allowance for accruing depreciation, employed the method which he designates as the Modified Sinking Fund Method and which Mr. Ellis designates as the Equal Annual Payment Method. The Master's findings on this subject are summarized on page 79 of his report where he expresses the conclusion that, for the purpose of determining the present value of said gas manufacturing plants and distributing system, there should be deducted from the reproduction values found by him on page 33 of his report the following sums representing the amount of estimated accrued depreciation, viz:

For the year 1913-14, the sum of \$1,518,390.00;
 For the year 1914-15, the sum of \$1,780,411.00;
 For the year 1915-16, the sum of \$1,493,162.00.

The Master found that the present value of plaintiff's said gas manufacturing plants and distribution system was as follows:

For the year 1913-14—\$11,275,618.00;
 For the year 1914-15—\$11,284,955.00;
 For the year 1915-16—\$11,683,925.00.

799 C. Amount of working capital.

The subject of working capital is considered by the Master on pages 80 to 84 of his printed report. The Master found that the amount of plaintiff's working capital reasonably required for conducting its gas department business in San Francisco during each of the three fiscal years in the period beginning July 1, 1913, and ending June 30, 1916, was the sum of \$300,000.00.

To this finding of the Master, the defendants did not except. The plaintiff did except to this finding, but, in taking its appeal to the Supreme Court of the United States, did not assign as error the action of the District Court in overruling this exception.

For the reasons here stated, it is deemed unnecessary to include in this statement any of the evidence adduced at the trial with reference to the subject of working capital.

800 D. Value of patent rights; also amount of savings effected by the use of patented inventions in the manufacture of gas.

Mr. E. C. JONES, recalled by plaintiff, testified as follows, viz:

I built plaintiff's gas manufacturing plant at Martin Station in 1905 and 1906 and constructed the first oil gas generators at plain-

tiff's Potrero Station in the early part of 1906. The generators at Martin Station and the Potrero Station, which I have just mentioned, are of the type which is generally known as the old Jones' Sets. These generators were my invention. Then I have developed improvements of oil gas so that now the plant is equipped with what is known as the new or improved Jones oil gas generators or sets as well as the old generators. The latest improved Jones oil gas system is the combined invention of myself and my son L. B. Jones. I have had direct charge and superintendence of the construction of the oil gas sets at the Potrero Station—both the new process and the old process. When the Pacific Gas and Electric Company acquired the Metropolitan Station, in the block bounded by Beach, Powell, Jefferson and Mason Streets, I was placed in charge. I found that plant was producing an oil gas and coke oven gas. The oil gas was made in coke ovens erected by the late T. S. C. Lowe. I immediately made improvements in the plant. I dismantled the
801 coke ovens and trimmed the plant up so that we could make oil gas of better quality and supply the Metropolitan district until such time as the distributing systems of the Metropolitan Company and the Pacific Gas and Electric Company should be tied into one general system for the distribution of gas. The Metropolitan station was made our field for investigation and improvement of the oil gas process. All of our primary experiments in the improvement of oil gas were made at the Metropolitan station and we developed results which warranted us in building the large oil gas plant at the Potrero station. The result of the improvements at the Metropolitan station increased the size of the plant from about 1,500,000 cubic feet in twenty-four hours to approximately 7,000,000 to 8,000,000 cubic feet in twenty-four hours on the same ground space with the same diameter of apparatus. In connection with these experiments I reconstructed the gas generators at the Metropolitan plant. The new improved Jones sets at the Potrero Station were put into operation in May, 1915. At that time Martin Station became obsolete and the old oil gas sets at the Potrero and the Independent Water Gas Works were thenceforth held in reserve—they did not become obsolete, but were used as needed, that is the old sixteen foot Jones sets at the Potrero were used when the new sets were not adequate to supply the demands of the town during
802 peak loads.

The old Jones sets at the Potrero and the Independent Works were actually in operation during the entire period from July 1, 1913 to the date when the new Jones sets came into use on the 3rd day of May, 1915. The Independent Water Gas Works was used during May and June and part of July, 1915. Each one of the four sixteen foot old Jones sets at the Potrero has been used from time to time since May, 1915. At times we have used as many as three of them.

The Independent plant has, since July, 1915, been kept as a reserve for use in case it were necessary to manufacture gas with the four sixteen foot Jones Sets at the Potrero. I consider the Independent Works as absolutely necessary until such time as two more

new Jones sets are erected and ready to operate at the Potrero station.

The reproduction value of Independent station is \$492,476.36. There would be no equivalency between the sets at the Independent station and two new Jones sets. The Independent station consists of six water gas generators with a maximum capacity of 500,000 cubic feet a day each, or 3,000,000 cubic feet a day of lampblack water gas. The two new Jones sets would have an every-day-in-the-year working capacity of 5,000,000 feet each—that is, there would be 10,000,000 feet produced by the Jones sets against a production of 3,000,000 feet by the Independent Sets.

803 The Independent station manufacturing its lampblack water gas and the four old Jones sets at the Potrero manufacturing oil gas must be considered together, one interlocking with the other. It has been my plan to abandon the Independent Plant upon building two new Jones sets, thus wiping off the \$492,476.36, leaving the four old Jones sets at the Potrero for use in case of emergency and to take care of the growth of the City until more improved Jones sets can be added.

It is possible to build two of the small water gas units like those at the Independent Plant capable of making a million feet of gas and operate them economically, but it would not be possible to construct one improved Jones set and operate it economically. It would be like a one-arm man. It would destroy the rythm of operation in the gas works. For instance, where we used one blowing unit for providing the blast for the machine for heating, we have one blowing unit to care for two machines and there is a perfect synchronism. Two men operate two machines and when one is taking off the heat oil the other is putting on the make oil. There is a perfect balance of operation. We are operating on a ten minute period of making gas. I would not think for a minute of building one improved Jones set in San Francisco at our Potrero works because of economic reasons in operation.

804 The two new Jones sets constructed in 1915 cost about \$285,000—it may have been more because it took us about a year to construct the plant as we were inventing and developing.

They were built during war times when it was very difficult to get material and they cost more than they otherwise would have cost. These two new Jones sets generate three times as much gas as the old Independent sets, and for that reason it would be very hard to make a comparison because one of the new sets would make almost double the amount of gas—it would make 5,000,000 feet of gas and the six Independent sets would only make 3,000,000 feet of gas.

These new Jones sets are built in accordance with a new invention and are operated in accordance with a new process then recently invented. The development of the idea began about 1912 and was worked out at the Metropolitan station. The ideas were so new and almost revolutionary that it was necessary to try a great many experiments at a great deal of expense in order to prove certain things, for instance, the synthetic production of Marsh gas. The develop-

ment of these ideas necessitated the rebuilding of the sets at the Metropolitan station and at the same time keeping them in shape to make gas to supply the City and County of San Francisco. We did not feel like trying experiments on a large scale by building an experimental gas works so I was permitted to try my experiments at the Metropolitan station. So it was by slow development covering a period of about two and one-half years that a new method of making gas became an assured fact and a success. We then

805 proceeded to build two standard sets at the Potrero station.

We found no cause to regret anything we did and no reason for changing any of our details of construction or operation. Construction of the two new Jones sets was commenced some time in 1914 and they were operated first on May 3, 1915.

The patent for the apparatus was issued in March 1914 and the patent for the process was issued in October, 1915.

The Metropolitan plant has been in condition to be operated and has actually been in operation during the entire period commencing July 1, 1913, and ending June 30, 1916, with the exception of the periods in the summer when we closed down for necessary repairs. We have found that in using oil gas generators the checker brick, which are used as reservoirs for storing heat in order to afterwards decompose oil into gas, are apt to get covered with carbon and if the brick is not very good, owing to the range of temperature,—very high and very low between the blasting period and the making period—it is apt to fly to pieces. So we have always repaired our oil gas generators before the holiday season, that is, before the gas peaks come on in the fall of the year. We supposed that would be necessary with the new sets, but with the old method of making gas we had a range of heat always over 1,000 degrees Fahrenheit in the temperature of the checker brick between the beginning

806 of the gas making period and the end of it, ten minutes.

In the new sets we found that there was not a variation in temperature of over 100 degrees, and sometimes not more than 50 degrees Fahrenheit during the gas making period. We found in fact, that there was a critical temperature at which the oil could best be dissociated into gas and we tried to maintain that critical point, with the result that the life of the checker brick was lengthened and the brick that was first used in the new sets at the Potrero in May 1915, are still in use, and I believe will go on through their third season.

It seems deplorable, almost, that we have to talk about the new process, because it is a new invention. It is along lines of new thought in gas making, of development in the gas business. It is in the line of progress and improvement. The Independent station, which looks so old fashioned and seems so, as we are discussing it, is toway what the United Gas Improvement Company of Philadelphia would call a modern double superheater water gas apparatus and if it was to attempt to improve it with its development in water gas during the last ten or fifteen years it would make very few changes. Our development in oil gas has simply left these water gas units away behind.

It will be desirable when the proper time comes to construct two additional new Jones generators and to abandon the Independent Works. I have recommended to the plaintiff's officers the construction of two additional new Jones generators. If we should order them now we would not be able to get them until near the end of 1918. If those two new sets should be constructed it would be absolutely unnecessary to keep the Independent Works any longer.

This new process was developed and put into operation at the Metropolitan plant during the year 1912. Patents were applied for that year in the name of E. C. and L. B. Jones. The construction of the two new Jones Sets was commenced in the summer of 1914 and they were brought into operation in May and July of 1915 at the Potrero station.

Counsel for plaintiff offered in evidence a copy of United States Letters Patent No. 1,089,926 and United States Letters Patent No. 1,157,225, an agreement dated November 30, 1915 between Messrs. Edward C. and Leon B. Jones as parties of the first part and Pacific Gas and Electric Company, the plaintiff herein, as party of the second part, and two licenses each dated November 30, 1915 made pursuant to said agreement. Counsel for defendant admitted the genuineness of the copies of said patents, agreement and licenses. These papers were all bound together and were admitted in evidence and marked Plaintiff's Exhibit No. 61. A true copy of said patent No. 1,089,926, omitting the specifications attached thereto is in the words and figures following:

"No. 1,089,926.

THE UNITED STATES OF AMERICA.

To all to whom these presents shall come:

Whereas Edward C. Jones and Leon B. Jones, of San Francisco, California, have presented to the Commissioner of Patents a petition praying for the grant of letters patent for an alleged new and useful improvement in apparatus for manufacturing gas, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and have complied with the various requirements of law in such cases made and provided, and

Whereas upon due examination made the said Claimants are adjudged to be justly entitled to a patent under the law;

Now therefore these letters patent are to grant unto the said Edward C. Jones and Leon B. Jones, their heir or assigns for the term of seventeen years from the tenth day of March, one thousand nine hundred and fourteen, the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington

this tenth day of March, in the year of our Lord one thousand nine hundred and fourteen, and of the Independence of the United States of America the one hundred and thirty-eighth.

[SEAL.]

R. T. FRAZER,

Acting Commisisoner of Patents."

809 A true copy of said Patent No. 1,157,225, omitting the specifications attached thereto, is in the words and figures following:

"No. 1,157,225.

THE UNITED STATES OF AMERICA.

To all to whom these presents shall come:

Whereas Edward C. Jones and Leon B. Jones, of San Francisco, California, have presented to the Commissioner of Patents a petition praying for the grant of Letters Patent for an alleged new and useful improvement in methods of manufacturing illuminating gas from liquid hydrocarbons, a description of which invention is contained in the specification of which a copy is hereunto annexed and made a part hereof, and have complied with the various requirements of law in such cases made and provided, and

Whereas upon due examination made the said Claimants are adjudged to be justly entitled to a patent under the law;

Now, therefore these letters patent are to grant unto the said Edward C. Jones and Leon B. Jones, their heirs or assigns for the term of Seventeen years from the nineteenth day of October, one thousand nine hundred and fifteen, the exclusive right to make, use and vend the said invention throughout the United States and the Territories thereof.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington this nineteenth day of October, in the year of our Lord one thousand nine hundred and fifteen, and of the Independence of the United States of America the one hundred and fortieth.

[SEAL.]

R. F. WHITEHEAD,

Acting Coommissioner of Patents.

810 A true copy of said agreement between Messrs. Edward C. Jones and Leon B. Jones and the Pacific Gas and Electric Company is in the words and figures following:

"This agreement made by and between Edward C. Jones, and Leon B. Jones, of the City and County of San Francisco, State of California, parties of the first part, and the Pacific Gas and Electric Company, a corporation duly organized and existing under and by virtue of the laws of the State of California, and having its office and principal place of business in said City and County of San Francisco, party of the second part, witnesseth that whereas said Edward C. Jones is the Chief Gas Engineer and said Leon B. Jones

is Assistant Gas Engineer of said party of the second part and have respectively occupied such positions for more than five years next prior to the date hereof; and

Whereas, during said period, said parties of the first part have invented and perfected a new and useful improvement in apparatus for manufacturing gas for which they have obtained from the Government of the United States of America a patent numbered 1,089,926 and dated March 10, 1914, and have also invented and perfected a new and useful improvement in methods of manufacturing illuminating gas from liquid hydro-carbons for which they have obtained from said Government a patent numbered 1,157,225 and dated October 19, 1915; and

Whereas, during the period that said parties of the first part were inventing and perfecting the aforesaid new and useful improvements, said party of the second part, acting in reliance upon the knowledge, experience and judgment of said parties of the first part, authorized and permitted the latter to make use of its gas manufacturing plants and facilities situate in said City and County of San Francisco for conducting on a commercial scale the experiments which were essential to the demonstration of the soundness of their theories and of the utility and commercial value of the inventions for which the aforesaid patents have been issued; and

Whereas said party of the second part, in order to make it possible for the parties of the first part to conduct the aforesaid experiments, made alterations in its gas generating apparatus, yard mains
811 and other appliances connected therewith at its Metropolitan Plant in said City and County of San Francisco in the year 1912 and again in the year 1914, and actually and necessarily expended in the making of such alterations a sum exceeding one hundred thousand dollars (\$100,000.00); and

Whereas said gas generating apparatus so altered has been in actual and successful operation almost continuously from the time when said alterations were made; and

Whereas said party of the second part, because of its belief in the utility of said inventions and in order to enable the parties of the first part to conduct on a larger scale additional experiments which were deemed important for the purpose of further demonstrating the economic utility and value not only of the first of said inventions for which patent was issued March 10, 1914, but also of the second of said inventions, viz., the improvement in the method of manufacturing illuminating gas for which patent was issued October 19, 1915, and also in order to enable the parties of the first part to perfect the means of applying and utilizing the last mentioned invention, constructed two entirely new gas generating sets and appliances connected therewith at its Potrero Plant in said City and County of San Francisco during the period commencing in March, 1914, and ending in April, 1915, and in constructing said sets and the appliances connected therewith expended a sum exceeding two hundred and fifteen thousand dollars (\$215,000.00); and

Whereas said new gas generating sets have been in actual and successful operation continuously ever since May 3, 1915; and

Whereas the alterations that were made in the gas generating sets at said Metropolitan Plant and the construction of said new gas generating sets in said Potrero Plant were planned, supervised and directed by said parties of the first part; and

Whereas the operation of the gas generating sets so altered and constructed has been under the constant supervision and direction of said parties of the first part as engineers of said party of the second part; and

Whereas such operation has resulted in demonstrating to the satisfaction of the parties to this agreement that each of said inventions is of great economic utility and value and can be utilized in the manufacture of gas for purposes of illumination and fuel to the great pecuniary advantage of the party of the second part; and

Whereas said party of the second part desires to obtain the right to use both of said inventions at its gas manufacturing plants in the Cities of San Francisco, Oakland, San Jose, Sacramento, Santa Rosa, Marysville, Grass Valley, Fresno and in all other places in that part of the State of California in which it is at present engaged in the business of generating, transmitting and selling gas; and

Whereas said party of the second part has authorized and permitted said parties of the first part to exhibit the gas generating sets and apparatus at its said Metropolitan and Potrero Plants to gas engineers, manufacturers and others interested in the manufacture and sale of gas in other parts of the United States and in Europe and has thus enabled said parties of the first part to prove to such gas engineers, manufacturers and other interested persons the economic utility and value of their said inventions and the feasibility of the utilization of said inventions in the manufacture of Illuminating and fuel gas wherever petroleum or liquid hydro-carbons can be obtained at reasonable prices; and

Whereas said parties of the first part believe that the privilege of exhibiting in actual operation the aforesaid gas generating sets wherein their said inventions are employed will be of very great value to them in negotiating the sale to others of rights to make, use and vend said inventions;

Now, therefore, said parties of the first part, for and in consideration of the premises and of the covenants of the party of the second part hereinafter contained, do hereby promise to said party of the second party;

1. That they, said parties of the first part, will, within five (5) days from the date hereof and concurrently with the payment to them of the sum of money hereinafter mentioned, grant to said party of the second part the exclusive right to use, in the counties of Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El-dorado, Fresno, Glenn, Madera, Marin, Mariposa, Merced,
813 Napa, Nevada, Placer, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Solano, Sonoma, Sutter,

Tuolumne, Yolo and Yuba, in the State of California, their invention of the new and useful improvement in methods of manufacturing illuminating gas protected by the aforesaid patent numbered 1,157,225, during the life of said patent and all improvements upon the last mentioned invention which shall be made or invented and patented by them before the expiration of the last mentioned period and which said party of the second part shall desire to use, and also the right to manufacture and construct for its own use (but not for sale to others) and the exclusive right to use, in said counties, the new and useful improvement in apparatus for manufacturing gas protected by said patent numbered 1,089,926, during the life of said patent, and all improvements upon the last mentioned invention which shall be made or invented and patented by them before the expiration of the last mentioned period which said party of the second part shall desire to use; provided, however, that said party of the second part shall reimburse the parties of the first part for all necessary fees and expenses which shall be paid by them for obtaining patents for all improvements which said party of the second part shall desire to use; and

2. That the rights so to be granted shall be assignable and transferable; and

Said party of the second part, for and in consideration of the premises and of the grant of rights to be made to it as hereinbefore provided, does hereby promise to said parties of the first part:

1. That it, said party of the second part, will, within five (5) days from the date hereof and concurrently with the delivery to it of a grant of the aforesaid rights, pay to said parties of the first part the sum of forty-six thousand sixty-six and 67/100 dollars (\$46,066.67) in United States gold coin;

2. That it, said party of the second part, will grant and afford to said parties of the first part, their heirs, assigns and personal representatives, the right and privilege of showing and exhibiting, at any and all reasonable times and subject to such reasonable regulations as may be adopted from time to time by the party of the second part, to any and all persons interested therein, its gas generating and manufacturing apparatus by means whereof said inventions shall be utilized and will, from time to time when and as it shall be reasonably requested so to do by the parties of the first part, prepare and give to the latter statements showing in reasonable detail the cost of manufacturing gas by means of such apparatus to the end that said parties of the first part, their heirs, assigns and personal representatives, may be able to prove to persons interested in said inventions or in acquiring the right to use the same the economic utility and value of said inventions and the feasibility of their use in places outside of the above mentioned counties of the State of California for the purpose of negotiating contracts or agreements for the sale of the aforesaid patents or rights to use the inventions protected thereby; and

3. That it, said party of the second part, will properly mark all apparatus manufactured or used by it and covered by said patent numbered 1,089,926 and all gas generating apparatus used by it in manufacturing gas by the method or process protected by said patent numbered 1,157,225 in the manner prescribed by the patent laws of the United States of America so as to indicate that such apparatus and such process are covered and protected by said patents.

In witness whereof the parties hereto have executed these presents in duplicate this 30th day of November, 1915.

EDWARD C. JONES.

LEON B. JONES.

PACIFIC GAS AND ELECTRIC COMPANY,

By JOHN A. BRITTON,

Its Vice-President and General Manager, and

[SEAL.]

By D. H. FOOTE,

Its Secretary."

True copies of the aforesaid licenses are in the words and figures following:

815 "Know all men by these presents that we, Edward C. Jones, and Leon B. Jones, of the City and County of San Francisco, State of California, for and in consideration of the sum of ten dollars (\$10.00) in gold coin of the United States of America to us paid by the Pacific Gas and Electric Company, a corporation duly organized and existing under and by virtue of the laws of the State of California, and having its office and principal place of business in the City and County of San Francisco, State aforesaid, and other valuable considerations by us received from said company, receipt whereof is hereby acknowledged, do hereby grant to said Pacific Gas and Electric Company the right to manufacture and construct for its own use (but not for sale to others) and the exclusive right to use, in the Counties of Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Eldorado, Fresno, Glenn, Madera, Marin, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Solano, Sonoma, Sutter, Tuolumne, Yolo and Yuba, in the State of California, our invention of the new and useful improvement in apparatus for manufacturing gas protected by patent No. 1,089,926, issued by the United States of America March 10, 1914, during the life of said patent, and all improvements upon said invention which shall be made or invented and patented by us before the expiration of the last mentioned period, and which said Pacific Gas and Electric Company shall desire to use; and that this grant of the right to use such improvements upon said invention is made upon condition that said Pacific Gas and Electric Company shall reimburse us for all necessary fees and expenses which shall be paid by us for obtaining patents for all improvements which said Pacific Gas and Electric Company shall desire to use; and further that we do hereby irrevocably consent that the whole or any part of

the rights herein granted shall be assignable and transferable by said Pacific Gas and Electric Company, its successors and assigns.

In witness whereof we have hereunto set our hands this 30th day of November, 1915.

EDWARD C. JONES.
LEON B. JONES.

Acknowledged before

R. J. CANTRELL,
Notary Public.

December 8, 1915.

Approved as to form Nov. 23, 1915.

WM. B. BOSLEY,
Attorney for Pacific Gas and Electric Company.

Recorded in United States Patent Office, May 26, 1916, in Liber C100, page 207, of Transfers of Patents."

816 "Know all men by these presents that we, Edward C. Jones, and Leon B. Jones, of the City and County of San Francisco, State of California, for and in consideration of the sum of ten dollars (\$10.00) in gold coin of the United States of America to us paid by the Pacific Gas and Electric Company, a corporation duly organized under the laws of the State of California, and having its office and principal place of business in the City and County of San Francisco, State aforesaid, and other valuable considerations by us received from said company, receipt whereof is hereby acknowledged, do hereby grant to said Pacific Gas and Electric Company the exclusive right to use, in the counties of Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Eldorado, Fresno, Glenn, Madera, Marin, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Solano, Sonoma, Sutter, Toulumne, Yola and Yuba, in the State of California, our invention of the new and useful improvement in methods of manufacturing illuminating gas protected by patent No. 1,157,225, issued by the United States of America October 19, 1915, during the life of said patent and all improvements upon the last mentioned invention which shall be made or invented and patented by us before the expiration of the last mentioned period and which said Pacific Gas and Electric Company shall desire to use; provided, however, that this grant of the right to use such improvements is made upon condition that said Pacific Gas and Electric Company shall reimburse us for all necessary fees and expenses which shall be paid by us for obtaining patents for all improvements which said Pacific Gas and Electric Company shall desire to use; and further that we do hereby irrevocably consent that the whole or any part of the right herein granted shall be assignable and transferable by said Pacific Gas and Electric Company, its successors and assigns.

In witness whereof we have hereunto set our hands this 30th day of November, 1915.

EDWARD C. JONES.
LEON B. JONES.

Acknowledged before

R. J. CANTRELL,
Notary Public.

December 8, 1915.

Recorded in United States Patent Office, May 26, 1916, in Liber C100, page 211, of Transfers of Patents."

817 During the period from January 2, 1906 to June 30, 1916, I do not know of any fact, condition or circumstance, other than the inventions and discoveries embodied in what we call the old Jones Sets at the Potrero and in the new Jones Sets covered by the aforesaid patents, that has operated in any way to reduce the cost of manufacture and distribution of gas in the City and County of San Francisco with the exception of small economies usually practiced as time goes on due to zeal in operating a plant. These small economies would be more than offset by the increase in wages and the shortening of working hours during that period so that it may be said that all of the economies were due to the savings of the new method in making gas—in manufacturing. That does not apply to distribution at all.

The process of manufacturing gas directly from oil first became a commercial success in the early part of 1906 at Martin Station and at the Potrero Station. No. 1 oil gas generator at the Potrero Station was first placed under fire February 26, 1906 and the first gas was made on March 10, 1906. The construction of that generator was commenced after the Pacific Gas and Electric Company had acquired control of the San Francisco Gas and Electric Company by the purchase of its stock on January 2, 1906.

818 Mr. M. H. BRIDGES, recalled for plaintiff testified on direct examination as follows:

The witness produced a statement which was admitted in evidence and marked plaintiff's Exhibit No. 62.

I prepared this table, plaintiff's Exhibit 62, from the books and records of the plaintiff and to the best of my knowledge and belief all of the facts shown in this statement are correctly represented, that is, they are correctly taken from the books of the company.

This statement shows the statistics and net costs of the gas generating department in the San Francisco district for the years 1912 to 1916 inclusive. The first sheet is a summary which I will proceed to describe. The details for the first year are contained on the sheet immediately following the recapitulation. It shows the generating costs and the statistics as to cubic feet of gas manufactured by months, gas sold to consumers, by months, and the percentage of leakage and gas used—that is, used around the office and the works and not sold to consumers; oil used, showing the barrels and the gallons per one thousand feet sold and per thousand feet manu-

factured; the cost of the oil in amount and the cost per thousand feet of gas manufactured; labor costs in amount and per thousand cubic feet of gas manufactured; miscellaneous expenses, including miscellaneous sundry labor, given in amount and per thousand cubic feet of gas manufactured; also miscellaneous material
819 and supplies, in amount and per thousand feet manufactured; the total generating costs are stated in amount and at the rate per thousand feet. These costs are given without including any return on the capital or property used in the manufacture and distribution of gas. They are the actual operating costs in connection with what is known in our accounting system as Generating Department. This statement for each of the years 1912, 1913, 1914, 1915 and 1916 is compiled on the same basis for the reason that we had our same accounting system in effect; and the segregations therefore are made under similar instructions and do not contain any other items than what are known as plant labor, material and costs in manufacturing gas as distinguished from other items, such as insurance, taxes, rate of return, etc. That information is given in the same way for each of the periods. It probably would be well to call attention to the last section which covers the periods by months of the years 1909 to 1916 inclusive, wherein is shown the gallons of oil per thousand feet of gas manufactured. The barrels of oil used were converted into gallons, by the method of 42 gallons to the barrel, and then that amount divided by the cubic feet of gas would give the gallons per thousand cubic feet. The whole calculation is not shown here. The gallons per thousand feet are arrived at by dividing the cubic feet of gas into the total gallons of oil used. The
820 barrels come as barrels of 42 gallons. It shows that in 1909 the average gallons of oil per thousand feet was 8.62; 1910 it was 8.4; 1911 it was 8.52; 1912 it was 8.28; 1913 it was 8.65; 1914 it was 8.21; 1915, 7.43. It will be noticed by the star that the improved Jones sets were in operation from April, 1915, down to the end of that year. In 1916 the efficiency was further increased and 7.18 gallons per thousand feet were used in the manufacture of gas.

If in the year 1916 I had only the figures for the year, 950,000 odd barrels of oil, and 5,560,000,000 cubic feet of gas, the gallons per thousand would work out 7.18, in other words 7.18 is not derived by dividing all the others by 12. It is a weighted average. You take the barrels and compute it into gallons and then compute the average. The operation of the first new Jones set began May 3. In the Metropolitan station, the new sets have been in operation since the autumn of 1912.

I think the last section of this statement (plaintiff's Exhibit No. 62) clearly shows the increased efficiency due to the improved process. Returning to the summary sheet, these figures are made up from the sheets immediately following, containing the detail of the various costs; to the years 1912, 1913 and 1914 we have added the costs for the period from January to March inclusive, of
821 1915, in order to conform with the data we have indicated on the last page that the improved Jones sets were in operation at the Potrero in order to arrive at a total figure to give us the

average efficiency for a period prior to when the full operation of the Jones sets was being had. This statement is not quite clear, for the reason that during a portion of this period, from 1912 to March, 1915 the results were affected by the operation of the Metropolitan sets, which I believe were put into operation some time in the latter part of 1912,—any way the results are shown on that basis. Taking the lines shown prior to the installation, we have a total for three full calendar years and the portion of 1915 on which we get our averages indicating a measure to apply to the subsequent period when the improved sets were in full operation in both the Metropolitan and the Potrero plants. It will be found that the total generating costs for the period, as indicated by the last column on the right, were 19.23 cents per thousand cubic feet of gas manufactured. In the portion of the year 1915, from April to December, inclusive, the average generating costs were 16.75 cents per thousand cubic feet; for the full year 1916, (although the costs were affected by the higher price of oil during the latter part of the year in which the price of oil reached \$1.06 per barrel) the average generating costs were 16.68 cents; so that since the installation of the
822 improved new Jones sets dating from April, 1915, to date, the average generating costs were 16.73 cents against an average cost for the prior period of 19.23 cents per thousand cubic feet of gas. I consider that the difference between these two amounts would represent the minimum savings effected, for the reason that the period adopted as a measure contained benefits from a partial installation of the improved sets at the Metropolitan Station, and of course since that includes the high price of oil in the latter part of 1916. We assumed this period here primarily because the records were easily available, and on account of the fact that the accounts were segregated on the same basis throughout the entire period. With those factors in mind, the saving per thousand cubic feet of gas manufactured since the installation of the improved Jones sets, has resulted in a total of $2\frac{1}{2}$ cents per thousand cubic feet—the difference between 19.23 and 16.73 cents—I consider that the minimum figure. In the summary we have a segregation of the $2\frac{1}{2}$ cents between oil, labor, miscellaneous expense and miscellaneous materials and supplies. Oil was used exclusively for the manufacture of gas since the year 1912.

A true copy of plaintiff's Exhibit No. 62 is as follows:

(Here follow paster tables marked pages 823-826, incl.)

PLAINTIFF'S EXHIBIT No.

Pacific Gas and Electric Company

San Francisco District.

Gas Generating Costs and Statistics, Years 1912-1916

Recapitulation.

Period.	Gas statistics.			Oil used.			Amount
	Cu. ft. manufactured.	Cu. ft. sold to consumers.	% leakage & used.	Bbls. total.	Gals. per M' sold.	Gals. per M' mfg.	
Year 1912.....	4,441,856,000	3,998,570,745	9.98	875,422.83	9.20	8.28	604,840
Year 1913.....	4,959,804,000	4,447,150,202	10.32	1,020,453.26	9.65	8.63	674,134
Year 1914.....	5,287,356,000	4,510,135,957	14.70	1,034,052.56	9.63	8.23	703,129
Jan.-Mar. 1915.....	1,548,835,000	1,359,135,600	12.50	299,301.08	9.26	8.13	205,660
Prior to Installation of Improved Sets.....	16,237,851,000	14,314,992,504	11.80	3,229,229.73	9.47	8.35	2,187,773
Apr.-Dec. 1915.....	4,616,210,000	3,757,080,478	18.70	791,626.06	8.86	7.20	544,295
Year 1916.....	5,560,300,000	4,958,389,300	10.80	950,934.00	8.06	7.18	685,700
Since Installation of Improved Jones Sets.....	10,176,510,000	8,715,469,778	14.40	1,742,560.06	8.39	7.20	1,229,995

Summary.

Saving per M Ft. Manufactured, Since Installation

Oil	
Labor	
Misc. Expenses.....	
Misc. M. & S.....	

Total

PLAINTIFF'S EXHIBIT No. 62.

Gas and Electric Company.

San Francisco District.

and Statistics, Years 1912 to 1916, Inclusive.

Recapitulation.

No. sold.	Gals. per M' mfg.	Crude oil costs.		Labor.		Misc. expenses.		Misc. M. & S.		Total generating costs.	
		Amount.	Per M ft. mfg.	Amount.	Per M ft. mfg.	Amount.	Per M ft. mfg.	Amount.	Per M ft. mfg.	Amount.	Per M ft. mfg.
10	8.28	604,840.18	.1360	193,886.00	.0437	36,545.96	.0082	19,369.45	.0044	854,641.59	.1925
5	8.63	674,134.87	.1360	255,268.46	.0514	39,696.34	.0080	26,708.10	.0054	995,807.77	.2000
3	8.23	703,129.98	.1332	240,145.39	.0450	36,661.60	.0069	14,205.33	.0027	994,142.30	.1878
6	8.13	205,666.40	.1328	64,412.93	.0416	8,667.25	.0056	979.54	.0006	279,726.12	.1805
7	8.35	2,187,771.43	.1348	753,712.78	.0463	121,571.15	.0075	61,262.42	.0038	3,124,317.78	.1923
6	7.20	544,295.23	.1177	185,240.04	.0402	26,860.71	.0058	18,388.56	.0040	774,784.54	.1675
6	7.18	685,700.07	.1233	192,531.67	.0346	31,569.91	.0057	17,569.28	.0032	927,370.93	.1668
9	7.20	1,229,995.30	.1210	377,771.71	.0371	58,430.62	.0058	35,957.84	.0035	1,702,155.47	.1673

Summary.

Incurred, Since Installation of Improved Jones Sets.

.....	\$.0138
.....	.0092
.....	.0017
.....	.0003
.....	<u>\$.0250</u>

Pacific Gas and Electric Company.
Gas Department.

San Francisco District.

Statement Showing Gas Efficiencies.

Year 1909.

Month.	Bbls. of oil used.	Gas manufactured.	
		Cu. ft.	Gals. per M.
January	76,816.08	381,759,000	8.46
February	64,746.80	315,701,000	8.62
March	65,717.04	311,150,000	8.88
April	52,814.51	257,046,000	8.63
May	54,388.09	259,246,000	8.82
June	48,238.40	233,191,000	8.70
July	47,904.91	236,393,000	8.52
August	52,153.38	254,856,000	8.57
September	55,284.63	268,583,000	8.66
October	62,269.69	302,737,000	8.64
November	69,244.56	241,721,000	8.53
December	81,688.23	403,622,000	8.84
Total Year.....	731,266.32	3,566,005,000	8.62

Statement Showing Gas Efficiencies.—Continued.

Year 1910.

Month.	Bbls. of oil used.	Gas manufactured.	
		Cu. ft.	Gals. per M.
January	79,560.28	396,538,000	8.43
February	64,858.94	334,171,000	8.16
March	64,793.34	343,100,000	7.95
April	57,999.66	297,379,000	8.19
May	52,799.51	258,180,000	8.58
June	49,897.85	242,817,000	8.62
July	48,745.44	234,487,000	8.73
August	52,662.14	256,105,000	8.63
September	53,473.81	262,081,000	8.58
October	60,714.32	305,123,000	8.35
November	66,213.40	335,052,000	8.29
December	72,247.18	359,945,000	8.44
Total Year.....	723,965.87	3,624,978,000	8.40

Year 1911.

January	75,211.86	373,693,000	8.48
February	65,258.38	330,781,000	8.28
March	67,508.17	333,298,000	8.51
April	58,726.89	284,893,000	8.66
May	54,218.10	267,173,000	8.51
June	48,849.57	245,933,000	8.34
July	48,574.93	245,491,000	8.31
August	54,235.46	269,083,000	8.47
September	56,242.46	274,672,000	8.59
October	64,346.01	313,337,000	8.62
November	70,049.44	342,137,000	8.60
December	86,731.86	419,829,000	8.67
Total Year.....	749,953.13	3,700,320,000	8.52

Statement Showing Gas Efficiencies.—Continued.

Year 1912.

828

Month.	Bbls. of oil used.	Gas manufactured.	
		Cu. ft.	Gals. per M.
January	77,228.71	462,153,000	7.03
February	72,856.00	395,021,000	7.74
March	73,937.00	393,045,000	7.90
April	66,437.16	358,538,000	7.77
May	61,203.99	342,597,000	7.50
June	58,558.58	304,185,000	8.08
July	63,848.02	330,988,000	8.11
August	64,522.40	305,575,000	8.87
September	67,094.37	342,972,000	8.20
October	77,612.74	344,971,000	9.45
November	89,021.71	420,539,000	8.88
December	103,102.15	441,272,000	9.82
Total Year	875,422.83	4,441,856,000	8.28

Year 1913.

January	110,951.53	510,752,000	9.13
February	87,308.61	411,438,000	8.90
March	89,747.70	447,319,000	8.43
April	77,684.77	396,531,000	8.23
May	78,768.21	374,451,000	8.84
June	71,044.09	339,939,000	8.77
July	69,588.67	343,975,000	8.50
August	74,788.13	361,871,000	8.69
September	74,177.02	371,146,000	8.40
October	84,049.42	422,021,000	8.36
November	93,785.20	459,369,000	8.58
December	108,559.91	527,316,000	8.65
Total Year	1,020,453.26	4,966,128,000	8.65

Statement Showing Gas Efficiencies.—Continued.

Year 1914.

Month.	Bbls. of oil used.	Gas manufactured.	
		Cu. ft.	Gals. per M.
January	105,487.83	519,560,000	8.50
February	87,101.59	432,924,000	8.45
March	87,565.23	442,642,000	8.32
April	79,394.16	416,418,000	8.00
May	79,118.41	421,772,000	7.88
June	74,627.23	393,598,000	7.96
July	79,769.42	387,830,000	8.63
August	81,736.02	404,568,000	8.50
September	78,391.29	398,132,000	8.26
October	81,197.99	436,199,000	7.82
November	88,050.33	456,383,000	7.96
December	111,613.06	568,330,000	8.24
Total Year	1,034,052.56	5,287,356,000	8.21

Year 1915.

329				
January	107,750.40	555,255,000	8.15	
February	96,177.65	481,177,000	8.40	
March	95,373.03	512,403,000	7.82	
April	85,107.17	x 483,783,000	7.39	
May	85,834.45	492,850,000	7.32	
June	80,632.14	453,760,000	7.46	
July	82,837.70	476,345,000	7.30	
August	86,753.91	494,742,000	7.36	
September	86,459.90	511,327,000	7.09	
October	90,940.79	547,034,000	6.97	
November	91,229.72	559,289,000	6.85	
December	101,830.28	597,080,000	7.17	
Total Year	1,090,927.14	6,165,045,000	7.43	

x Improved Jones sets in Operation.

Statement Showing Gas Efficiencies.—Continued.

Year 1916.

Month.	Bbls. of oil used.	Gas manufactured.	
		Cu. ft.	Gals. per M.
January	108,225.26	613,947,000	7.41
February	87,462.48	513,765,000	7.16
March	83,243.26	510,018,000	6.86
April	73,350.26	416,340,000	7.40
May	71,887.45	412,816,000	7.31
June	66,567.69	398,264,000	7.02
July	63,371.69	381,992,000	6.98
August	69,475.76	411,767,000	7.09
September	70,871.38	409,031,000	7.26
October	80,140.43	468,864,000	7.17
November	83,273.03	481,202,000	7.26
December	93,065.31	542,294,000	7.24
Total Year	950,934.00	5,560,300,000	7.18

830 Cross-examination:

The figures on leakage shown in this exhibit (No. 62) are the difference between the two columns showing the cubic feet of gas manufactured and the sale of gas to consumers. The gas manufactured is contained in the first column. It is shown on the station meter.

The amount of leakage shown in this table will not necessarily conform to the amounts given by Mr. Jones in his testimony because the amounts recorded in plaintiff's books are arrived at by a method which involves the use of averages as applied to the dates when meters are read and the quantities of gas consumed as shown by meter readings. Statement takers are engaged every day in reading meters although as a rule each consumer's meter is read once a month.

Mr. E. C. JONES recalled by plaintiff on direct examination testified as follows:

On page 2 of exhibit 62, under the heading of gallons of oil used per thousand feet manufactured and sold, there is shown a smaller quantity of oil used in January, February, March, April and May of 1912, than in the later months of that year. During the year 1912 there were no station meters in San Francisco with the exception of one in use at the Independent Station for measuring lamp black water gas. The amount of gas made was estimated on an assumption of 8.8 gallons of oil at the Potrero Station

831 and on the actual amount of oil used at the Independent Station, which amounted to from $6\frac{1}{2}$ gallons to 7 gallons per thousand cubic feet of gas made. The Metropolitan Gas Works was shut down for the purpose of remodeling on January 31, 1912, and remained shut down until October 27, 1912, when No. 4 generator was started. On November 12, 1912, No. 1 generator was started. During this period the Potrero and Independent stations supplied all of the gas to the city, and it was necessary to operate the Independent Station at full capacity or nearly full capacity during this period. The oil gas generators at the Potrero were also operated at a point of high efficiency and the comparatively small amount of oil used at the Independent plant combined with the large amount of accumulated lampblack which was used and not charged to the cost of the gas resulted in the good oil showing for 1912. Station meters were placed in commission in San Francisco and measured all the gas beginning in March, 1913.

We have continued using the lampblack for boiler fuel at the Potrero plant. The Independent Plant is held as a standby and no lampblack has been used for the manufacture of lampblack water gas. The amount of oil shown here is the total amount used for the generation of gas. The only oil used outside of that shown here for the generation of gas is a very small amount used at the Metropolitan

station for firing the boilers. I believe it never is in excess
832 of .4 or .5 of a gallon per thousand cubic feet at that station.
If we were not drawing upon the lampblack at the Potrero
Station we would be using oil for that purpose.

Cross-examination:

I testified as a witness for the company before the railroad commission of the State of California on the hearing for the fixing of rates. In such testimony I did not at any time introduce the contract with reference to the patent rights. I had nothing to say about the patent rights or the right that the company might have to use the patents. It was here admitted that these contracts with regard to the patents were not introduced in evidence in the Railroad Commission hearing, and that up to the present time the defendant has never made any claim in rate fixing proceedings for a valuation of these patent rights.

Mr. M. H. BRIDGES, recalled for plaintiff, testified as follows:

The statements in exhibit 62 were confined to the manufacture of gas in San Francisco only and do not include any manufacture of gas at Martin Station.

Mr. E. C. JONES, recalled for further cross examination testified as follows:

When the Independent Plant was operated in 1912, we used the lampblack at the Independent plant for the purpose of manufacturing water gas. If we had not had the lampblack we would
833 have been compelled to substitute anthracite coal or coke and if we had substituted anthracite coal at 40 pounds to the thousand cubic feet—and we will assume \$8.00 a ton as a fair price—it would have cost about 14¢ a thousand cubic feet for solid fuel for manufacturing gas. We used oil at the Independent Station for enriching only. You understand that the water gas as manufactured at the Independent Station is a non-luminous gas of very low heating value. It is composed of hydrogen and carbon monoxide. One has 344 British Thermal units to the cubic foot and the other 343. In order to bring up the heating value and give the gas body and stability and make it merchantable we used oil for enriching it. We used from 6½ to 7 gallons per thousand cubic feet for enriching it. We used lampblack and tar for fuel under the furnaces at all times at the Independent plant. In the new sets at the Potrero we used only oil for making gas. At the Metropolitan Station we use what lampblack and tar is made with a small amount of oil to piece it out as fuel under the steam boilers. It is not necessary to use any oil now at the Independent Station for the purpose of enriching gas because that station is not being operated. The gas made at the Potrero Station at present is made entirely from the new Jones sets.

Mr. JOHN A. BRITTON, a witness called on behalf of plaintiff, testified as follows:

834 I am sixty-one years of age and reside at Redwood City in the State of California. I am now and since July, 1907, have been the vice president and general manager and chief engineer of the Pacific Gas and Electric Company. When the Pacific Gas and Electric Company was organized in 1905 I was elected its president and continued as such until July, 1907. Since 1903 I have been the vice president and general manager of the California Gas and Electric Corporation, the immediate predecessor of the Pacific Gas and Electric Company. For many years prior to 1900 I was secretary and engineer of the Oakland Gas Light and Heat Company. In 1900 I was elected president of that company. I have held the position of president until the present time. Beginning very shortly after I entered the employ of the Oakland Gas Light and Heat Company in 1874, I had a great deal to do with the laying of gas mains and services and from that time on with the erection of the buildings in connection with said company's gas works. Upon the advent of electricity in the lighting field, I became the superintendent of the electric light works of said company and superintended the installation of the electric plant almost in its entirety. When I entered the employ of the California Gas and Electric Corporation in 1903, I took active charge of all its construction work in its gas, electric and hydro-electric departments and have continued as chief engineer in charge of all construction since that time. I supervise all appropriations for new work, new construction
835 and reconstruction, operation and maintenance, pass upon all plans for all work, determine upon its applicability to the business of said company. I am the determining factor as to whether the construction shall or shall not be done. My work necessarily keeps me thoroughly familiar with all construction work both gas and electric and with the cost thereof. I am a member of the American Society of Mechanical Engineers, of the societies of Civil Engineers and of Electrical Engineers. I was elected president of the San Francisco Gas and Electric Company in 1906 and have retained that position up until the present time. Since 1906 I have had actual charge of the affairs of said company. I was very familiar with its properties prior to the fire of April, 1906. I familiarized myself with the gas and electric properties of that company by visiting every plant that the company owned and by a study of its maps of underground mains and I traversed the entire city to familiarize myself with its overhead lines.

The gas plant at Martin Station was completed and commenced operations some time in February, 1906. This was after the Pacific Gas and Electric Company had acquired the stock of the San Francisco Gas and Electric Company. The California Gas and Electric Corporation had a contract with the United Railroads of San Francisco to supply the latter with energy for the operation of its cars. The gas engines were built at Martin Station as a standby to guarantee that service. The California Gas and Electric Corporation

836 manufactured oil gas at Martin Station by what is known as the old Jones sets or the old Jones process. It was not patented at that time. The San Francisco Gas and Electric Company manufactured gas by the water gas process. There was a very decided economical saving in cost per 1,000 cubic feet of gas manufactured by the old Jones process in comparison with the cost by the water gas process that was being used by the San Francisco Gas and Electric Company.

I have made a study and an investigation of the amount of oil that is saved by the process of making gas that is used in the new Jones sets as compared with the amount of oil that is used in making gas in what we call the old Jones sets. Our records disclose that, in the plants where the old Jones sets were operated solely, without reference to the operation of a water gas set, the average, running over a long period of time, per thousand cubic feet of gas, was something over 9 gallons of oil. In the San Francisco district in the years from 1908 to 1914, in which years we have a very complete and accurate detail of operating costs, the average of all the plants operating and as operated during that period, including the old Jones sets, shows a use of practically 8.4 gallons of oil. Under present operating conditions it takes on the average less than 7 gallons of oil to manufacture a thousand cubic feet of gas with the new Jones sets at the Potrero, and that not under most economical conditions. This average prevailed during the latter part of 1916, for the first five
837 months of 1917 and a portion of June of 1917. I have made a study of the savings in labor costs per thousand feet of gas as manufactured by the use of the older process and the labor costs of manufacturing a thousand cubic feet of gas by the new process. This saving in labor as indicated in our records, has amounted to a little over 1¢ per thousand cubic feet. In the same years, when our records were quite complete, the actual cost of manufacturing labor—I am speaking now not of maintenance labor but merely of the labor applied to the manufacture of gas—was 4.4¢ per thousand cubic feet. In 1915, a portion of the year the operation being under the new Jones sets, it dropped to 4.05¢. In 1916 it dropped to 3.46¢. In the first five months in 1917 it was 3.16¢ per thousand cubic feet. That does not include any saving on the maintenance which I have not calculated. That clearly shows, taking the five months of 1917 as compared with the years from 1908 to 1916 a saving of 1.24¢ per thousand cubic feet. In my opinion the saving in labor cost has been attributable to the change in process of manufacturing gas. The larger sets are easier of operation and require a smaller number of men to operate them.

I have also made a study of the effect upon the future operation of this company in its San Francisco Gas Department of its ownership and exercise of the rights secured by the patents covering the inventions of Mr. Jones as embodied in these new Jones sets,
838 projecting the saving of two gallons of oil per thousand cubic feet and 1¢ and over as the saving per thousand cubic feet in the manufacture labor. I have taken the actual amount of gas manufactured in the seven years mentioned, from 1908 to 1914, and

the increase in manufactured gas in those eight years a total of 72% or an average of 9% a year. I have tried to be conservative and have estimated the increase in the sales of gas in San Francisco during the remaining life of the patent—at a 5% annual increase; I say conservative because in my judgment with the larger demands for gas for industrial purposes that the company is cultivating every day, I look for a much larger increase than that; in the years past the average increase has been nearly between 9 and 10% in every gas plant of any importance; but assume only 5% as the increase, the saving of 2 gallons of oil per thousand would indicate a total saving in the sixteen years yet left of the patent of \$6,305,610. I made the computation based upon oil at only \$1.00 a barrel although the present price is about \$1.35. That is estimated during the entire life of the patent. There are 16 years remaining of the patent. That is the saving computed on the 2 gallons of oil per thousand at \$1.00 a barrel for the oil represents an annual saving of \$394,110 and for the 16 years it is \$6,305,610. This estimate goes back to January 1, 1917. Labor at 1¢ per thousand projected on the same basis of manufacturing gas for the next 16 years shows a total saving of \$1,324,690 or a total saving of oil and labor in manufacture alone and not estimating any saving in maintenance, of \$7,630,300. This estimate would cover the period from January 1, 1917, to the expiration of the life of the patent.

Mr. W. G. VINCENT, JR., recalled for plaintiff, testified as follows:

I have prepared a statement entitled "estimated savings that will be made in the cost of manufacturing gas in the San Francisco Gas Department by use of Jones improved oil gas process from the year 1917 to 1932, inclusive." This statement is designed to show the present worth of the savings to be effected by the use of the process used in the new Jones sets based on the estimates which have just been given by Mr. Britton concerning the savings in oil and labor effected by that process. These computations have been correctly prepared to the best of my knowledge and belief. Based on the testimony and assumptions given and made by Mr. Britton the present worth of the future savings amounts to \$4,203,300. This involves discounting at the rate of 7% compound interest.

Said statement was here admitted in evidence and marked "plaintiff's exhibit 67," and a true copy of it is as follows:

840

PLAINTIFF'S EXHIBIT No. 67.

Pacific Gas and Electric Company.

Estimated Savings Which Will Be Made in Cost of Manufacturing Gas in the San Francisco Gas Department by the Use of the Jones Improved Oil Gas Process, Years 1917 to 1932, Inclusive.

Estimated Present Worth of the Right to Use this Process in the San Francisco Gas Department.

Year.	Gas to be made, estimated 5% increase each year, M cu. ft.	x Saving per M cu. ft.	Total saving.	Present worth factor 7% interest.	Present worth June 30, 1916, of future savings.
1917	5,600,000	.0576	\$322,600	.935	\$301,600
1918	5,880,000	.0576	338,700	.873	295,700
1919	6,174,000	.0576	355,600	.816	290,200
1920	6,482,000	.0576	373,400	.763	284,900
1921	6,806,000	.0576	392,000	.713	279,500
1922	7,146,000	.0576	411,600	.666	274,100
1923	7,503,000	.0576	432,200	.623	269,300
1924	7,878,000	.0576	453,800	.582	264,100
1925	8,272,000	.0576	476,500	.544	259,200
1926	8,687,000	.0576	500,400	.508	254,200
1927	9,121,000	.0576	525,400	.476	250,100

1928	9,577,000	.0576	551,600	.445	245,500
1929	10,056,000	.0576	579,200	.415	240,400
1930	10,559,000	.0576	608,200	.388	236,000
1931	11,087,000	.0576	638,600	.362	231,200
1932	11,641,000	.5676	670,500	.339	227,300
Total, 16 years.....		.....	\$7,630,300	....	\$4,203,300
Average .....		.....	\$476,900		

x "Saving per M" estimated as follows:

Saving of Oil—2 gallons at \$1.00 per bbl.....	\$.0476 per M Cu. Ft. of Gas Generated
Labor Saving.....	.01
Total Saving.....	.0576

841 Mr. JOHN A. BRITTON, recalled by the plaintiff, on direct examination testified as follows:

In my testimony with reference to the savings effected by means of the new Jones' process I assumed a price from January 1, 1917, of \$1 per barrel. By "barrel" I meant a barrel of 42 gallons. I did not assume that the price of oil during the period subsequent to January 1, 1917, and during the life of the patent would probably not be less than \$1 per barrel of 42 gallons. My thought was to simply make a price for the purposes of calculation. Oil is now approximately \$1.35 a barrel for San Francisco bay deliveries. I do not expect, according to my experience of the past years, that oil will ever get as low as \$1 a barrel, delivered at bay points. I rather look for the maintenance of the price at approximately the market price today. While it is impossible for me to forecast for sixteen years, I see no condition of our oil production of today that would warrant any lower price, but rather a higher price in the years to come than now exists. I assumed \$1 per barrel as a minimum possible price for the period which is below what I believe the minimum price will be. I could have named \$1.50 and made the calculation on that basis and sustained it with my view according to what the price of oil will be. I could sustain almost any view as to what the price will be in the future. I have seen oil as low as 42¢ a barrel and we have paid as high as \$3 a barrel. The governmental
842 policy with reference to the release of withdrawn lands and the development of new fields will have its effect. Another factor will be the policy of the government with reference to the terms and conditions upon which hydro electric power might be developed during the period that it will come into competition with gas. I cannot imagine that the price of oil or other known processes of making gas would make the use of the new Jones process prohibitive during the next 16 years.

Mr. Bridges: The payments to Mr. E. C. Jones for his patent rights are carried in the general ledger, under the heading, I think—I am not quoting the heading exactly—of Patents. It is carried not in our plant account but in our investment account, our capital account, we call it, amortizing one-seventeenth each year.

The investment in Mr. Jones' patents is included in the plaintiff's books as a part of the general assets and no part of it is apportioned to the San Francisco district.

N. B.—The Master's discussion of the subject of patent rights is contained on pages 84 to 87 of his printed report.

VOLUME 3.

In the Southern Division of the District Court of the United States
in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and
Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, et
al., Defendants and Respondents.

*Condensed Statement of Evidence Prepared Pursuant to Equity Rule
No. 75 and Order of Court Approving the Same.*

Endorsed: Filed April 5, 1922. Walter B. Maling, Clerk.

843 E. Value of going concern or established business.

Mr. J. T. RYAN, a witness called by the plaintiff, having qualified
as a civil engineer and an expert in the valuation of public utilities,
testified, on direct examination, in substance as follows:

I have been a civil engineer for the last twelve years. My educa-
tion consisted of common and high-school courses.

My first position was that of clerk in construction organization for
the city of Los Angeles. Later, from 1906 to the end of 1909 I was
an assistant to the construction engineers on the Los Angeles acqued-
uct. During 1910 I was in charge of the General Headquarters
Camp at Mojave for the same project and had charge of the dis-
tribution of materials at that point, in addition to the accounting of
construction work.

In the summer of 1910 I was employed by Bion J. Arnold of Chi-
cago in the valuation of the Southern California Edison Company
in Los Angeles and the surrounding country.

Early in 1911 I was employed by J. G. White & Co. in their San
Francisco office and continued with them until April 1916. The
early part of my experience with them was in the valuation of public
utilities covering most of the large gas and electric properties

844 in the State of California.

Early in 1913 I was assigned to making economic studies
of the development of the gas properties in Bakersfield for the San
Joaquin Light & Power Company. Later in the year I worked on
the valuation and organization of properties subsequently known as
the Midland Counties Public Service Corporation. In that opera-
tion I was employed as an engineer.

In 1914 I was employed under J. G. White & Co. in the study of the development cost and going concern value of the Marin Water & Power Company. That case involved condemnation proceedings before the Railroad Commission, before which body our studies were presented. During the same year and running into the following year, I was assigned to the making of going concern values and development cost studies for the San Joaquin Light & Power Corporation. In 1915 I did the same work for the Southern California Gas Company. Practically the same line of study was made for the Western Water Company during 1915, valuations for the purchase of water properties being made for that company during the same year and early in 1916.

During 1915 and through 1916 I was employed by the Valley Natural Gas Company of Bakersfield in its organization and in the purchase of natural gas properties and in the financing of the entire enterprise. I have been similarly employed in the last four years on some six or seven other small enterprises in the same capacity.

Since April 1916, I have been employed by the Pacific Gas
845 & Electric Company in the preparation and presentation of evidence with respect to going concern values before the Railroad Commission and in preparation for this hearing. I am at present employed by the Pacific Gas & Electric Company in its Rate Department and have collaborated with Mr. W. G. Vincent, Jr., the engineer at the head of that Department, on the matters here taken up.

With J. G. White & Co. during the last two or three years of my employment, I have had charge of all the valuation work done by the San Francisco office and have appeared for them and have had charge of the studies made in all the rate cases for which they were employed to present technical data. This work included studies of development cost and going concern value, in addition to studies of the physical values of the properties. We were employed by some twelve or fourteen gas and electric utilities in this state, the larger of which were the San Joaquin Light & Power Company, the Northern California Power Company, the Southern California Gas Company and the Bakersfield Gas & Electric Light Company.

J. G. White & Co. is a firm of engineers with general offices in New York. Their activities extend all over the United States and include very nearly every line of engineering construction and financing.

In the course of my employment with J. G. White & Co. I have appraised properties on behalf of either purchasers or sellers for the purpose of advising such persons as to the values of the prop-
846 erties. One instance was the purchase by the Valley Natural Gas Company of the natural gas properties owned by the Standard Oil Company in the Midway Oil Field. Another was the purchase by the Midland Counties Public Service Corporation of the property that later merged under that corporate title. Another was the purchase by the Western Water Company of the water distribution systems in several towns in the oil fields near Bakersfield, Kern County. In each of these cases I represented the purchasers. With the exception of the Midland Counties Public Service Corporation the

purchases were approved by the Railroad Commission. In several other cases in which I was involved the parties were unable to fix a satisfactory price and no sale was consummated.

In each case presented before the Railroad Commission where the purchase was approved, the element of intangibles was considered and the earning power of the property was carefully scrutinized. No separate allowance was made but a lump price was determined. That lump price included both physical values and the value of going concern.

I was employed in the construction organization of the Los Angeles Gas & Electric Company during 1902 and 1903 in a subordinate position.

I have been frequently consulted by various clients, including the Southern California Gas Company and the San Joaquin Light & Power Company concerning operating matters, largely in connection with rates.

847 At the time I became connected with J. G. White & Co. in 1911 they had undertaken the valuation of all of the properties of the Pacific Gas & Electric Company and I was employed on that work continuously from the beginning to the end of it, or a little over a year. At that time we only considered the physical elements.

During the past fourteen months I have been almost exclusively engaged in the study of the intangible elements of the value of the property and the cost of development of the business of the plaintiff, in the study of the historical record of the plaintiff's property, its business, its organization and the consolidation of the various properties that have been merged into the main enterprise. I have made a special study of the Pacific Gas & Electric Company's gas property and business in the City and County of San Francisco, with a view to arriving at a conclusion as to the going concern value of that business, or what should be considered as entering into the value of the property and business as a whole over and above the value of the physical properties as determined on the reproduction theory. I have undertaken to examine and analyze every bit of record and data that could be obtained from the Company's past history, and my work has been as comprehensive as it could be with the records that have been left after the destruction caused by the great fire and earthquake of April 18, 1906. I have examined the books and records of the Metropolitan Light & Power Company, which went back only

848 to May 1, 1906, the records prior to that time having been entirely destroyed in the fire of April, 1906. These books give almost the entire history of that company because it had only commenced to serve gas a few months prior to the fire in the district known as "Chinatown" and the territory between that and its gas manufacturing plant on the waterfront at North Beach, which territory was all burned over by the fire. After the fire the Metropolitan Light & Power Company had no consumers at all, and had to build up its business anew from that date. I have also made a study of the available records of the San Francisco Gas & Electric Company,—all that we have been able to find since the fire. Some of these records go back to the earliest period of the gas business in

San Francisco, but they do not afford a connected narrative of that company's business sufficient to show its development cost, or a basis for working out a going concern value after the fire.

I have examined the records of the San Francisco Gas & Light Company and its successor, the Pacific Gas & Electric Company, since April 1906, and am advised as to the number of the plaintiff's gas consumers and the amount of gas sold in San Francisco since 1906; I know of rules generally recognized among valuation engineers and practical business men and investors in public utility properties, for ascertaining approximately the going concern value of public utility properties. I have known these rules to be used frequently as a means of defining practically the limitations of value; that is, in considering a given price that was offered or asked

849 for a given property, the relationship of that price to the valuation or the cost of reproducing the physical property would be scrutinized in the light of these short-cut methods

of estimating values as applied to the going concern; that is to say, if it exceeded a given relationship it was considered high, if it went below another ratio, or you might say a lower limitation, it would be considered low, and it would be regarded as the effect of other conditions that would tend to reduce or increase the price that an owner would be willing to accept for the property, or a purchaser would be willing to pay. These practical rules which I have referred to are resorted to more or less as checks in the particular investigation, and have been so used by valuation engineers. These rules were used and referred to quite frequently in connection with the sales of the properties which I have already mentioned.

Among valuation engineers there is a method of ascertaining the going concern value of properties known as the comparative plant method. As usually employed, this method has been the projection of earnings of an existing property into a given period in the future and a comparison of the net amount after paying operating expenses of that existing plant with those of a theoretical comparative plant, which is assumed to begin business at the present time without any earnings; the differences between these net earnings are accumulated and carried forward under interest until the expiration of the given period and the aggregate amount at that time is

850 regarded as determining the going concern value as determined by that method. This comparative plant method applied to intangible values, or the value of going concern, is substantially the same as the reproduction method applied in appraising physical properties. It assumes the reproduction of the business during the same period and under the same conditions as that which is assumed for the reproduction value of the physical properties. Where the original records are available valuation engineers resort to the original cost of developing the business as a basis for forming an opinion as to the value to be assigned to that element. I consider this evidence very important. Often it is convincing and can be shown very clearly. This method corresponds very closely to the method of valuing the property by ascertaining the amount of the investment in it. It is the same thing applied

to going concern or intangible elements of value as the investment in the production of the physical properties, that is, actual development costs, otherwise known as historical development costs. This is different from the comparative plant method, in that it is the taking of actual records and the actual history of the property and constructing a complete analysis of its actual cost during the development of the business. It has one serious weakness in the older utilities and that is that the economic conditions which affected its original development, may have been so far changed during the progress of time that it would be difficult, if not impossible, to conceive of them applying to the present time. I mean it would be difficult to get a reproduction cost by the historical method where the period of time is too great. In the San Francisco gas
851 enterprise, for example, we go back to a period where they were making gas from coal, which they had to import from regions as far away as England and Australia. The process of manufacture was so crude that the cost of generation alone, very often exceeded four dollars per thousand cubic feet. Even if we had such a record, as would be necessary to establish the actual cost of development under those conditions, it would afford little help in determining what that going concern value is now.

There is another method of appraising going concern that is sometimes referred to as the investment method, that is recognized by valuation engineers. This method involves analyzing the obligations that would be necessarily incurred in the development of a business, or in the organization and development of a going concern. This method involves a study of the amount of securities of different types or kinds that would be issued for the purpose of financing a corporation engaged in a similar business, and developing its property and its business.

The methods already mentioned may all be considered as belonging to one general group, that is a group of methods based fundamentally on the cost of development.

There is another group of methods based on the estimated value as reflected in the earning power of the properties and the companies operating them. The first group may be defined as determinations of cost, while the last group referred to involves determination of value based on other hypotheses largely dependent on earning power. In the latter, the underlying consideration is the
852 value as reflected in earning power or in the market value of securities, which in turn would be based very largely on earning power.

Under the general subdivision of methods that are based on estimated value, there is one method known as the comparative net earning method. This method involves the ascertainment of the excess value of an existing plant, with its going business and its earnings over that of a similar plant with neither business, earnings nor income, as determined by a comparison of the net earnings over a given period, usually determined by projecting both into the future. You would start with a plant that has an established business, and with another plant that has none, and project the busi-

ness of each into the future and make a comparison of the results in the way of net earnings for the owner. This method is usually associated with the names of Mr. Alvord and Mr. Metcalf, the gentlemen, I believe, who first developed it.

In connection with a business that has been brought about by the bringing together of a number of different enterprises and consolidating the properties and business under one ownership, there is an element that is considered of importance in ascertaining the going value of the concern that has finally acquired the ownership of all the different properties. This element is the value of a unified system. It is very often noted to a marked extent in the value of securities of a given enterprise after a merger with others in the same line. So far, I have never been able to find any definite
853 basis of working it out or applying it. It is simply one of the factors in the problem. If the consolidation results in greater economy in administration and in the making of savings, and thus in an increase of the net earnings, that would be reflected in the valuation.

As I have already stated there are certain conventional methods or certain practical rules that have been used more or less by engineers, which are generally based on the gross or net earnings of a property, the physical values and on the number of consumers. It is not always possible to apply each one with the same degree of weight to any given property. For example, in the case of a utility which was largely a wholesaler, and had but few consumers, although its volume of business might be large, and its property values high, it would not be possible to apply to it any conventional unit cost per consumer, as a basis of determining the value of going concern. Among the conventional methods there is one that proceeds largely upon the ascertainment of the market value of the securities outstanding in case the owner of the property and business is a corporation. That method involves a determination of the total market value of all outstanding securities and obligations of the enterprise and a comparison of its total with the physical values. I consider that the most direct evidence of value we can get.

It is the price that investors and owners interested in the property are willing to take for it or are willing to pay for it. If the sale is of magnitude and under no duress of necessity it ought to reflect the result of a very careful study of values on the part
854 of both sides to the transaction, that is, on the part of the purchaser and on the part of the seller. In any case where you apply this last method, that is, a case where you ascertain the market value of the outstanding securities of the corporation owning the property and the business, and obtain a difference between their market value and the value of the physical properties, the difference will inevitably cover not only going concern value but any other intangible element of property that is not included in the specific appraisement of properties.

The specific appraisement of properties generally covers all physical properties and landed properties. In such appraisements, so far as my knowledge goes, patent rights are seldom, if ever, taken into

consideration; in the case of these conventional methods no distinction is made between the different items of intangible property such as franchise, going concern, patent rights, etc. Working capital is always classed as tangible or physical property. In negotiations for the purchase or sale of a given property, among the first things asked for is a schedule and valuation of its physical assets. From that as a starting point, the next inquiry is: What other elements of value are there that can be produced by the owners as a basis for defending the price asked? Usually it comes down to a consideration of what portion of the gross earnings, or how much per consumer, or what percentage of physical property is the proper basis for asking an additional sum over the value of physical properties. The method or rate usually applied is the one most pertinent to that particular property.

855 The comparative net earning method makes no provision for distinguishing between going concern and franchise and other intangible elements of properties; it involves a determination of all intangible values, all values in excess of those included in a physical valuation. The same thing should be true in a measure of the methods that deal with the cost of development. If there were an actual direct expenditure in the acquisition of franchises that probably would be included in the cost of the properties that were appraised in determining the development cost by the original records of the company. Naturally those expenditures for acquisition of franchise would be included in it and would be one of the items going to make up the total.

Under the reproduction theory it naturally would be assumed that the cost of the plant that was being scrutinized would include the elements of value as shown by the physical valuation only. In that case the element of franchise would not be considered on either side.

I have prepared a statement showing the result of my investigation of the so-called going concern value or established business value of the gas property of the Pacific Gas & Electric Company in San Francisco, together with the basis of my conclusion, and in this I have detailed in general the studies and the extent of the studies which I have made as a foundation for the different conclusions given.

This statement was thereupon admitted in evidence, marked "Plaintiff's Exhibit No. 46," and read by the witness as part of his direct testimony. A true copy of this statement, together with questions put and answers given while it was being read, is as follows,

viz:

856 **Going Concern Value San Francisco Gas Properties.** Value of Physical property: The physical properties owned by the Pacific Gas and Electric Company and operated in the production and sale of gas to the people of San Francisco have been appraised by competent and experienced engineers, who, after thorough and carefully detailed study, have fixed their reproduction cost, exclusive of cash and working capital, as of June 30, 1914, at approximately \$14,800,000.

I have not quite the exact figure there, because of some adjust-

ments in details that have been made since this study was prepared; I have quoted it approximately.

Going concern values—General Principles: It may safely be asserted that no transaction involving the value of a business enterprise is ever concluded without careful consideration of the nature of its activities, the permanence of the market for its product, and the manner in which and the extent to which it measures up to the economic needs of the community it serves. Separate and apart from the physical equipment it utilizes, certain energies and agencies that give character and stability, provide credit and develop resourcefulness are inseparably associated with any successful institution, and the prosperity it enjoys may be very definitely gauged by the thoroughness with which it employs these so-called "Intangible" facilities in solving the problems and meeting the emergencies that constantly confront it.

857 A utility that owns and operates a gas generator obviously possesses the value incident to its ownership, but a utility that owns and successfully operates a gas generator, and in addition, includes in its organization the engineer that invented and the executive that installed it, and employs that organization not only to operate existing equipment, but to devise new mechanism for improved operation, not only to meet present demands, but to anticipate those of the future, such a utility renders a higher service, and thereby possesses greater values both intrinsically and to the community served, than those represented by its physical structures.

These values include its connected business, its financial credit, its ability to serve the present and future economic needs of the community, its development, ownership and use of improved facilities for the production and utilization of its products, its capacity for continued improvement in these facilities, the efficiency and progressive character of its organization, and the extent that it holds the confidence and respect of the general public.

Value may, and often does, appertain to a property independent of the extent, or even of the fact, of cost, and may, therefore be acquired without the expenditure of money. Conversely, the expenditure of money, even when directed by experience and ability, may not result in the creation of values. For these reasons proof of cost is not conclusive evidence of value, nor may an award of value fairly be denied solely for lack of evidence of cost.

858 These considerations apply with peculiar force to the conditions under which a claim for the value of a property as a going concern must be made. The result desired, namely, a conclusion as to value, must not be confused with one of the factors introduced to sustain it, namely, the proof of its cost. The development of a going business almost invariably involves the expenditure of money, the employment of energy, and the exercise of ability and intelligence, all of which, if the records are complete, may be determined and expressed in terms of money. It generally involves the assumption on the part of the property and its owners of obligations to pay stated sums to the holders of its securities. The business thus developed may have value, and may not, both de-

pendent upon the success of the enterprise and the profitableness of its operations.

Cost is an important element to be considered in the study of value, and while it should be carefully weighed, its use has some very definite limitations. With reference to the subject at hand, the circumstances attending the original development of the gas industry in San Francisco and the economic condition of the community at the time are so different from those of the present that the original cost, even if ascertainable, should be given little if any weight in determining the value of that business today or the cost of development under conditions now obtaining.

In recent decisions some regulatory bodies have denied claims for going concern value where there was a presumption that the enterprise had, through later earnings, recovered the expenditures made in acquiring its business; it would seem that such decisions questioned the ownership, instead of the value, of a going business, and that the reversal of such manifestly unreasonable precedents involved legal procedure rather than engineering analysis. However, it is difficult to understand why a business ceases to be valuable when it becomes profitable, and for that reason, it appears anomalous that a fact, normally regarded as evidence of value, should be used as a pretext for denying it.

Theories and methods: The Company's structural and landed properties having been appraised on the theory of reproducing them within the shortest time feasible under an average of recently past conditions, it is the object of this study to ascertain the Company's additional value as a going concern, its property rights in the business it transacts, the value of the service it has created and is prepared to maintain, its share in the general increase in wealth and prosperity enjoyed by the community it serves, and to which it has materially contributed. In the somewhat less analytical practice of the past this has been done through approximations based upon personal experience and individual judgment of interested parties, and a figure usually determined somewhere between the extremes. As a means of more exact computation, and to provide a more accurate measure of legitimate property rights, students of economics have in recent years developed, and used as a basis of comparison, several theories capable of general application, the use of which it was hoped would be helpful to courts and regulatory bodies in determining the reasonable award in contested cases where mutual agreement could not be reached. The more generally used of these methods may be briefly defined as follows:

1st. Cost of Development: *a.* Original Cost.—The cost of developing the business as determined by the difference between the actual return realized from the Company's operations and a fair return during the entire life history of the property—the interest upon these differences being compounded annually.

b. Reproduction Method.—The cost of acquiring the business as determined by the accumulated deficits incident to operating a comparative plant during the period required to acquire a business equal to that of the existing system.

c. Investment Method.—The security obligations, in excess of physical values, that would be incurred in financing a comparative plant, assuming interest and dividends to be paid in common stock when earnings are insufficient for that purpose.

2nd. Estimated Value: *d. Comparative Net Earning Method.*—The excess value of the existing plant with its going business over that of an identical plant without business or income, as determined by a comparison of net earnings of a comparative plant with those of the existing system during the development period.

e. Unified System.—The value of a unified system as distinguished from the cost of reproducing the individual units that compose it.

f. Conventional Approximations.—Based on annual gross earnings, physical values and number of consumers.

g. Market Value.—The difference between the appraised value of the existing plant and the market value of all outstanding securities, based upon representative sales under normal market conditions.

Application: *a. Original Cost.*—By far the greater part of the records of the earlier gas enterprises in San Francisco were destroyed by fire in 1906 and cannot be restored. It is, therefore, impossible to obtain from the history of the company and its predecessors sufficient data to determine the original cost of developing its business.

b. Reproduction Method. Comparative Plant.—While the lack of early records makes a complete analysis of the company's actual development impossible, we are not entirely without evidence of cost. The Metropolitan Light & Power Company and its immediate predecessor, the San Francisco Coke and Gas Company, installed a gas plant and a system of street mains immediately prior to the fire of 1906 and developed a profitable business between that time and November 1911, selling it during that month at a price that afforded a fair measure of its going concern value. Its property and business amounted to about 15% of that of the San Francisco Gas & Electric Company's gas department in 1911. The records of these companies were accurately kept and are fairly complete, and the conditions attending their development very similar to those which would be assumed as a basis for an estimate of reproduction cost under the comparative plant theory. The data has been carefully analyzed and compared in detail with that obtained from the Pacific Gas and Electric Company's records during the same period and subsequently, and from the information taken from both sources an appraisal of reproduction cost has been made under the following general assumptions.

It will be assumed that the property now owned and the business now possessed by the Pacific Gas & Electric Company in supplying gas to San Francisco have been acquired and developed during the past nine years by an independent organization, which at its inception, found the city imperfectly served by two obsolete or inadequate systems, that a short period of severe competition was followed by the purchase of the competitors, that the enterprise was financed in the same manner, with the same kinds of securities and in approximately the same proportion as the Pacific Gas and Electric Company, and that the property was created and a going business developed under the economic industrial and political conditions obtaining during the time (1907-1916) and under the gas rates then in effect.

A period of preliminary investigation and research of twelve months is assumed, with an additional eight months of active study and preparation before the beginning of construction. A temporary organization is formed at the beginning of the second year, consisting at first of an attorney, an engineer and a commercial agent, with their assistants. As the plans mature, this organization is increased to meet the needs of the work and is finally merged into the permanent staff. The purpose of this force is to provide a working basis for the promotion, incorporation and financing of the enterprise, to do all the active work incident to attracting capital, to work out the legal, engineering and commercial problems encountered in bringing a group of investors together and forming from them a cohesive organization through which a great property and a vital public service are to be created. The estimated expense of this period is as follows:

Month.	2nd year.	3rd year.
1st	\$1,500.	\$6,000.
2nd	2,500.	5,000.
3rd	4,000.	5,000.
4th	6,000.	4,000.
5th	7,000.	4,000.
6th	7,000.	5,000.
7th	8,000.	7,000.
8th	9,000.	10,000.
9th	10,000.	5,000. (Operation
10th Construction Begins. . .	8,000.	4,000. Begins.)
11th	7,000.	2,500.
12th	6,000.	1,500.
Reports of consulting engineers, expense of inspecting by fi- nancial representatives, etc.,		15,000.
	<hr/> 76,000.	<hr/> 74,000.

Total organization, promotion, etc., \$150,000.

The Independent and North Beach plants, each with a system of mains, are assumed to be in existence under separate ownership and competitive operation; the new enterprise begins by erecting the Metropolitan plant and extending an additional distributing system into the territory already occupied, and, after a year of active competition, purchases both competitors, improves one generating plant and discards the other, the increasing business renders additional generating facilities imperative and in the fifth year the Potrero works are begun, which are enlarged in the seventh and completed in the eighth year. Gas will be first delivered at the beginning of the ninth month of the third year, and the present business acquired in a little more than six years, the development progressing as follows:

864

Annual Development.

Year.	Proportion of capital expended.	Proportion of consumers served.	Proportion of gross income acquired.
1	.1%		
2	9.0%		
3	19.5	4%	1.51%
4	31.8	16	15.29
5	53.7	32	29.52
6	70.8	52	48.91
7	83.6	72	66.08
8	94.1	88	79.64
9	100.0	100	94.43
10			100.00

Perhaps it would be well to make an explanation of the annual development table. On page 31 of this exhibit will be found a table showing the proportion of the plant installed annually, and the relative ratio that each portion of the operative plant bears to the total investment, the first line in each case showing the proportion of the different departments to the total investment, and the second half of each column showing the ratio that that bears to the total investment also, that is, the proportion installed each year is first stated as the proportion of that department, and then the ratio of that proportion to the total investment, the columns being added to show the total amount annually required for the construction of the physical plant; that amount is recapitulated below showing the total annual requirement to the total amount of investment at the end of each year.

The Master:

Q. In other words, this table on page 8 that you have just read is supported by the data on pages 30 and 31?

A. Yes.

865 Q. How did you determine the figures on Page 31?

A. They were taken from the basic assumption of construction, and the period of time required to build the properties as shown by the physical valuation.

Q. That is, you went through Mr. Jones' inventory and built it up hypothetically?

A. Yes.

Mr. Searls:

Q. Do you mean you took the historical periods, or that you merely assumed periods required to reproduce the property listed in Mr. Jones' inventory?

A. I took the physical property listed in Mr. Jones' inventory and applied a theory of construction extending over the periods shown on page 31.

The Master:

Q. Would you suggest, then, Mr. Ryan, that we insert a notation in your exhibit at this point referring to the subsequent pages?

A. Yes.

Mr. Bosley: That is, on Page 8, to make a cross reference to pages 30 and 31.

The Master: I will put that note just before the table that is given on Page 8; I will make the note, "See Pages 30 and 31."

The Master:

Q. Mr. Ryan, you have just referred to the detail sheets, 30 and 31 of your exhibit; have you anything more to say about that?

A. I might say in connection with this same Table of annual development that we are under the necessity of assuming a development cost of a property as it exists at the present time; that would require a consideration of a great many of the essential factors that attended the actual creation and development of this property.

866 For example, at the beginning of the development period, relatively speaking, there were in existence in San Francisco three gas manufacturing plants and the distribution systems that were installed under competitive conditions for the marketing of the products of the plant; consequently in outlining a theory of development cost to fit those conditions it would be necessary to assume the existence of the same plant and virtually the same process of development that actually attended the existing system. In order to make that harmonize with the facts as far as possible, it is necessary to reverse the order of installation to some extent and assume the development of an idea and a theory of service that would fit in with these plants. On that basis I have assumed the North Beach plant with a system of mains and the Independent plant with a system of mains had been in existence prior to the inception of the utility as it now stands, and that the new enterprise began with the con-

struction of the plant now known as the Metropolitan plant and at a period of time estimated for competitive conditions to have exhausted the resources of the smaller enterprises, to have absorbed them, and then as the business grew, to construct the large Potrero plant and ultimately abandon the North Beach plant and rebuild the Independent, adapting it to the new process of manufacturing.

The financial program requires that the organizers of the new enterprise purchase the initial stock issues of \$1,500,000 at par, and a later issue of \$525,000 at 80. Upon commencement of operation, 5% bonds with face value of \$2,312,000 are floated at 80, followed by additional issues as necessity arises. The competing systems are paid for by issues of common and preferred stock, and as increasing earnings afford a satisfactory basis for further issues, bonds and preferred stock are sold at intervals to provide funds as needed to complete the development.

Mr. Searls:

Q. This is a further assumption, is it?

A. That is a further assumption, yes. The Table on Page 59 shows the relative dates based on the years as shown in the program of development as shown on Page 31, that these securities would be issued and that the amount that would be assumed to be realized from their sale.

Mr. Bosley: Do you suggest then that a reference be made at the end of this paragraph on Page 8 to Page 59?

A. Yes, it would be well to note that.

Statements of earnings and operating expenses of the system have been worked out in careful detail, based upon data taken from the operating history of the Company and its predecessors. On account of the obvious similarity of its surroundings to those of the assumed comparative plant during its early years, the Metropolitan Light & Power Company's records of consumption per meter, rate of growth, cost of production, and distribution, uncollectible accounts, and commercial and general expense have been used almost entirely as the basis for computing similar costs for the first three years, while for the last year the Pacific Gas and Electric Company's records for 1915 have been applied. These statements, with details of computation and the assumptions upon which they are based, are submitted herewith (pages 30 to 56) for more thorough consideration.

This is a general reference to the detail of the supporting data; specific reference page by page will be made in the context as we progress and allusions made to them.

It is assumed that six years will be required for construction and a like period for the development of business, five years of the two periods overlapping, making, with the two years of preliminaries, nine years in all. These periods appear, in the light of such data and experience as are available to be somewhat shorter than would be possible except under the most favorable conditions conceivable.

The experience of the City of New Orleans in installing a domestic water system, when under the menace of a virulent epidemic, due largely to the poor quality of the existing water supply, and the spur of severe penalties applied by police authorities to lagging prospective consumers, a longer period even than that assumed here was incurred, may be quoted as illustrating the essential slowness of the operation. The history of this enterprise is given in great detail by Mr. Henry Floy in his work on 'Value for Rate Making' and need not be recounted here.

Mr. Searls: Your honor, I will not object at this point to that statement, although it is obviously hearsay, but I think it only fair to make the observation, and counsel can take it if he sees fit, that this story about the City of New Orleans was gone into in considerable detail in the Spring Valley record, and it developed there that the rainfall and other statistical data were entirely different from conditions in San Francisco so as to make the requirements for
869 the water system lag considerably; also the figures of consumption and the use of water were very different. It is not

right to accept a baldfaced statement like this without some inquiry into the underlying data. I think, Mr. Bosley, his Honor is sufficiently familiar with whatever was developed in the other record on this subject so that he is perfectly able to give it whatever weight he sees fit to give it. I will not object to the statement, if you will permit him to take judicial knowledge of what he already knows.

Mr. Bosley: I will concede that your statement may be considered as being based on facts developed in the investigation in the other case and that that statement may be considered by the Master. I think this is the only reference in this statement to the experience in New Orleans.

Mr. Searls: I have no personal knowledge of it; Mr. Metcalf, or the Spring Valley Company, had made a study of the matter and gave the question some consideration.

Mr. Bosley: I assume that the facts are as you state and I am willing that the Master may so assume in considering this particular statement.

Q. You may proceed now, Mr. Ryan.

A. A further example of the time required for the construction of a large system of street mains is found in the high pressure fire system installed by the City of San Francisco. The absolute necessity for building this system was demonstrated in 1906 and steps for its installation were among the earliest actions taken by the City authorities following the great fire. After numerous technical reports during 1907, and much agitation, discussion and
870 debate, a resolution adopting the plans was introduced in December of that year and the installation of the system was accomplished in the following order:

- 1908, Jan. 27th. First ordinance.
Mar. 30th. Election ordered.
May 11th. Bond election.
Sept. 1st. First bonds sold.
Oct. 9th. Cistern contract awarded.
1909, Mar. 10th. Pipe bids received.
Mar. 24th. Pipe contracts awarded.
1910, July 8th. First street main contract awarded.
1914, July 24th. Last street main contract awarded.
Oct. 9th. Last street main contract completed.

Mr. Searls:

Q. Based on city records?

A. Based on city records.

The actual installation of this system has, therefore extended over a period of six years, under conditions of utmost urgency.

A statement of operations of the Comparative Plant, as described previously, has been prepared, which, assuming an interest rate of 8% annually on the actual investment, shows a total accumulated deficit at the end of the period of \$2,833,688 (page 32). This amount includes interest during construction, and inasmuch as the valuation of physical properties includes interest items amounting to \$397,249, the figures for development cost should be correspondingly reduced, leaving the net amount \$2,436,439.

Investment Method: The security obligations, in excess of physical values, that would be incurred in financing a comparative plant, assuming interest and dividends to be paid in securities when earnings are insufficient for that purpose.

It is assumed that the comparative plant would be financed through the issue of securities similar in character and proportions and bearing similar rates of interest to those of the existing company; that an initial issue of common stock, taken by the promoters at par, is followed by bonds and preferred stock as required by the progress of development; and, inasmuch as the earnings would be inadequate to provide either interest or dividends at first, that the security holders would receive common stock at 75% of its par value, in lieu of cash, as their return until the earnings were adequate. At the close of the development period the total securities outstanding would have a par value of \$19,941,700 or \$4,941,625 in excess of the cash investment. During this period the funds for amortizing bond discount would have accumulated \$162,533 which, deducted from the total par value, would leave a security liability of \$4,779,092 in excess of physical values.

If it may be assumed that these securities would have a market value equal to that of those now outstanding on the existing plant, the investment value of the property at the close of the development period would be as follows:

Securities outstanding.	Par value.	Market value.	
		% of par.	Amount.
Bonds	\$11,720,000	.966	\$11,321,520
Preferred Stock	2,667,000	.91	2,426,570
Common Stock	5,554,700	.60	3,332,820
Totals	\$19,941,700		\$17,080,910

872 If the development deficits of the comparative plant, amounting to \$2,833,688 are added to its structural cost, the total cost, \$17,833,763 would be 89.4% of the par value of all outstanding securities.

Details of the financial program and the computations based thereon are submitted herewith on pages 57 to 61.

d. Comparative net earning method: "The excess value of the existing plant with its going business over that of an identical plant without business or income, as determined by a comparison of net earnings of a comparative plant with those of the existing system during the development period."

Values as thus defined are usually estimated by projecting into the future the history of the existing and comparative plants and by comparing the net results at the end of a given period. It is exceedingly difficult to apply this procedure to the appraisal of an artificial gas enterprise, for several reasons. During the past nine years, five different processes of gas manufacture have been employed in San Francisco, rates have ranged from \$.75 to \$1.00 per 1,000 cubic feet, and fuel oil prices have fluctuated from \$.42 to \$1.20 per barrel. The same influences are at the present time as active as at any previous period, and we have no means of forecasting their effects. The future of both earnings and operating expenses is, therefore, contingent upon uncertain political economic and technical developments, which make an appraisal based upon anticipating them so unstable as to impair its evidentiary value.

873 We may, however, make a comparison between the net earnings of the existing plant during the past seven years with that determined by the analysis of the comparative plant during its development period, and the result, while somewhat less equitable to the utility than that obtained by following the usual method, will reflect the operating hazards and contingencies actually encountered during the period covered, and will, therefore, fix the minimum value that may be determined through the application of this theory. Computations showing this comparison in detail are submitted herewith on pages 62 to 65, the resultant value being \$2,340,880.

Unified system: The value of a unified system, as distinguished from the cost of constructing or acquiring the individual units that compose it, cannot reasonably be ignored in any determination of

value. Broadly construed, this definition covers all the elements of going concern values except, perhaps, those fixed by considerations of cost. An award in accordance with it necessarily involves a determination of the economic as well as the purely physical elements and should be a measure of the extent to which the design, cost and efficiency of the plant harmonize with its present business, and the probability that it will keep pace with further developments in the standards of service. Insofar as a valuation by this method may be determined by cost, the records of development cost quoted include it, and insofar as it may be reflected in values as indicated in sales of property and of securities based thereon, it is fully covered, although not separately indicated.

874 Clearly, two separate enterprises, one of which manufactured gas and the other distributed and sold the output, would be subjected to greater expense in the aggregate than if the two functions were combined in one system. There would be a separate staff of general officers with the accessory expense of rent, furniture, etc., and aduplication in many of the minor operations such as metering, accounting, testing, etc. Under our system of taxation, based upon gross income, the taxes paid by the manufacturing enterprise would be a duplication in part of that paid by the distributing agency, and would be eliminated by a merger.

It is obvious that substantial economies could be effected through combining the two enterprises into a single system, although such a merger alone would by no means form the basis for an appraisal of value in accordance with the definition. Inasmuch as there are several gas companies now operating in California that purchase all or part of the gas they sell, it may be of interest in this connection to indicate the saving in state taxes alone that could be effected through a merger with the manufacturing concerns. The principal gas utilities so operated are as follows, the figures being for 1915 except for the Valley Natural Gas Company.

The following table shows the value of the physical property in each case as determined by the utility itself, given in round figures. The second column shows the cost of gas purchased in 1915; the third column, the taxes on that amount, at 5.25%—

875 The Master: That is the legal rate now, is it?

A. That was the legal rate during 1915; it is now higher. The fourth column is the capitalization of those taxes at 8%, that is, assuming the amount of taxes to be 8% of the amount of the saving to be attained through the merger. The last column is the relation of the capitalized taxes to the physical property. There are six companies listed there, with an average saving to be effected through the capitalization of the taxes saved through a merger of 9.38% of the physical property.

	Distributing.	Producer.	Value of physical property.	Cost of gas purchased 1915.	Taxes 5.25 %.	Taxes capitalized at 8%.	Ratio of taxes to capitalized physical property.
	Palo Alto Gas Co.	Pac. Gas & Elec. Co.	\$90,000	\$23,837	\$1,251.44	\$15,643	17.38%
	Long Beach Cons. Gas Co.	So. Cal. Gas Co.	550,000	81,300	4,268.25	53,353	9.70
	Economic Gas Co.	So. Cal. Gas Co.	900,000	67,825	3,560.81	44,510	4.95
	S. J. Lt. & Pr. Corp.	Cal. Nat. Gas Co.	350,000	36,082	1,894.30	23,679	6.60
	Southern Counties Gas Co.	Standard Oil Co. & Others.	550,000	41,358	2,171.29	27,141	4.95
	Valley Natural Gas Co.	Standard Oil Co. & Others.	610,000	185,540	9,140.85	121,761	19.96
			<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
			\$3,050,000	\$635,942	\$22,886.94	\$286,087	9.38%

876 In addition to the above, several utilities among which are the Los Angeles Gas and Electric Corporation, the Southern California Gas Company and Southern California Edison Company, purchased a portion of the gas sold by them and manufactured the remainder.

These figures are quoted merely to show that there is a substantial value attaching to a unified system, as distinguished from the cost of its structural units, but that it is exceedingly difficult to define or follow a satisfactory process of appraising it. On any determination of value based upon the comparison of net earnings, market value of securities, or by the approximations, the cost of the unified system is accounted for and its value, as measured by the standards set fully included.

For these reasons no separate estimate of values based on a unified system is submitted.

Rule-of-thumb approximations: In the construction, development, financing and sale of American public utilities, it has become a custom to consider many of the elements of value in the light of their relation to certain plant units and operating factors, and while the computations as made are not always used to determine value, they have been extensively employed to define its limitations. Under ordinary conditions, for example, the construction of an electric generating station should not exceed a certain sum per horsepower of installed capacity, and, likewise, the ratio of operating expense to gross earnings of a given business, of railway earnings to track or train mileage, and of net earnings to fixed charges, are some

877 of the factors to which investors, promoters and speculators devote careful attention.

In considering an investment in water, electric or gas utilities the factors of value immediately apparent are:

- 1st. The Cost of Reproducing the physical property.
- 2nd. The Gross and Net Earnings.
- 3rd. The number of Consumers.

The application of rule of thumb methods to such cases has generally been made after the desirability of the investment has been established, and for the purpose of determining the reasonableness of the price. Their use has been to fix the upper and lower limits of reasonableness, the extremes between which supply and demand and the specific necessities and trading ability of purchaser and seller are governing influences in fixing prices. Applied to an enterprise such as the San Francisco gas property, in the secure possession of a profitable territory, conservatively financed, with satisfactory credit and under capable management, the conclusions as to value reached by apply the rule-of-thumb methods would range between the extremes as follows, the preferable figure in each case being underscored.

Based on Physical Valuation.

15%	.....	\$2,250,000
20%	.....	3,000,000
25%	.....	<u>3,750,000</u>

Based on Gross Revenue for 1915.

(Exposition and commercial arc earnings omitted.)

878	
75%	\$3,027,750
100%	4,055,550
	<hr/>
125%	5,083,250

Based on Number of Consumers.

\$25.00 each	\$2,832,700
30.00 "	3,399,240
	<hr/>

g—Market value of securities:

It is manifestly true that the face value of securities issued in capitalizing a property seldom accurately reflect its value, but it is equally true that when securities issued have been subjected to the acid tests of stock exchange marketing and the scrutiny of the investing public, the price at which they are sold does state the conclusions of purchaser and seller as to the values represented by them, including intangibles, and such sales, if under normal conditions, in considerable volume, and between responsible parties alike free from necessity or coercion, should be given careful weight in determining the value to be awarded the enterprise in any regulatory action. It is estimated that during the past five years approximately ten thousand sales of Pacific Gas and Electric securities were made on the local stock exchanges, and at least that many more offers to purchase or sell were tendered that resulted in no sale because the offers varied in fractional degree from ruling quotations. The gross amount of actual sales was considerably in excess of the total securities outstanding. We have here evidence of value as represented by actual purchase and sale, not by one or a dozen, but by thousands of men; not merely the statement of one, or of a dozen competent witnesses, that a property has value, but the evidence of thousands of individuals who have not only placed an estimate of value on the Pacific Gas & Electric Company, but who have sold or purchased a partnership interest in it at the valuation they have made.

The Pacific Gas and Electric Company had outstanding securities, including those of subsidiary companies, on December 31, 1915, with face and market values as follows:

Security.	Par value.	Market value.	
		% of par.	Amount.
Bonds	\$76,172,800	96.583 %	\$73,569,806
First Preferred Stock	12,586,400	90.	11,327,760
Preferred Stock..	10,000,000	92.	9,200,000
Common Stock...	34,035,858	60.	20,421,515
Total	\$132,795,058	Average 86.24 %	\$114,519,081

The reproduction value of the company's physical properties, exclusive of water rights and intangibles, as determined by J. G. White & Co. on December 31, 1911, was \$69,235,225. The additions and betterments from January 1, 1912 to December 31, 1915, together with working capital, were \$29,602,265. which makes a total valuation as of Dec. 31, 1915 of \$98,837,490.

The value of the San Francisco gas properties, including working capital, was approximately 15.9% of the total, and if we may assume that 15.9% of the total issues fairly represents the capitalization of these properties, the securities so chargeable would have at that time the following face and market value:

880	Security.		
Bonds	\$12,111,475	96.583 %	\$11,697,626
First Preferred Stock...	2,001,238	90.	1,801,114
Preferred Stock	1,590,000	92.	1,462,800
Common Stock	5,411,700	60.	3,247,020
	<u>\$21,114,413</u>		<u>\$18,208,560</u>

Excess security liability over physical values \$5,396,232, or 34.3%.

The outstanding securities of the company are, therefore, only slightly different from the amount permissible either under Commission precedents or the probable requirements of developing a comparative plant, as will be apparent from the following résumé:

On basis of— Col. (1.)	Physical plant values. (2.)	Security liability. (3.)	Excess of security liability over physical plant value.	
			Amount. (4.)	%. (5.)
1 Comparative Plant	\$15,000,075	\$19,941,700	\$4,941,625	32.9
2 Metropolitan Plant	1,684,843	2,276,407	591,768	35.2
(See Page 23.)				
3 (Stricken Out.)				
4 Pacific Gas & Electric Co.				
a-Total Plant	98,837,490	132,795,058	33,957,568	34.3
b-San Francisco (pro rata)	15,718,181	21,114,413	5,396,232	34.3

Other Evidence: Appraisals of going concern values made by applying comparative plant theories are frequently questioned on the grounds that the assumptions involved may be insufficiently supported by competent data fairly applicable to the property under consideration. In compiling the foregoing an effort was made to incorporate in the supporting exhibits all available information pertinent to the subject, but certain additional evidence 881 deserves careful study in connection with the data presented and is submitted herewith for that purpose. It includes:

1. The cost of developing a profitable gas business in San Francisco as shown by the books and records of the Metropolitan Light & Power Company, and the value of that business as indicated by the price paid for it by the San Francisco Gas and Electric Company in 1911.

2. Evidence of going concern values as established by certain public utility sales in California under approval of the State Railroad Commission.

Metropolitan Plant.

For the purpose of this study we are fortunate in having a complete history of a gas company which began business in San Francisco with an operative plant immediately after the fire of 1906 and which by the close of 1911 had reached a sufficiently profitable condition to warrant its sale at a price affording its promoters a fair measure of going concern value. A careful analysis of the records left by this Company has been made and is submitted herewith on Pages 66 to 69.

The Metropolitan Light and Power Company was incorporated in 1907, taking over the property and business of the San Francisco Coke and Gas Company, which had been organized in 1899 to manufacture coke from bituminous coal, the inferior quality of gas incidentally produced being sold to the San Francisco Gas and Electric Company for distribution.

882 Mr. Bosley: That statement is slightly inaccurate as the company was the same, it merely being a change of name, the San Francisco Coke and Gas Company, to the Metropolitan Light and Power Company, at the time the company decided to enter into the business of distributing and selling gas to the public.

Mr. Searls: It was not a new corporation?

Mr. Bosley: It was not a new corporation. You may now proceed, Mr. Ryan.

A. (Continuing:) Finding much difficulty in selling coke the company adapted its plant to the production of gas from crude oil, and upon the expiration of its marketing contract in 1905, began the installation of a distribution system and entered into active competition with the existing utilities for business. The great fire of 1906 came when the first unit of the system was complete and some 1,500 consumers connected, and while the company suffered

little material loss, the territory occupied by its distribution system was entirely within the burned area and its business consequently entirely destroyed. The brief time it had operated as a utility prior to the fire and the completeness with which its previously established business was destroyed renders its subsequent history very similar to that which might be expected from a theoretical comparative plant.

The cost of the property as it existed May 1, 1906 was taken so far as available records established it, and to them was added an estimate of original cost of the comparatively small amounts for which records could not be found. The totals are less than the
883 amount the company realized from the sale of its securities, and consequently are probably less than actual cost, although the company had some operating losses prior to the fire and was damaged by the fire itself. Following is a statement of transactions in securities prior to May 1st, 1906:

102 bonds sold at par.....	\$102,000
179 " " " 70.....	125,000
250 " " " 80.....	200,000
624 " " " 85.....	531,000
7,000 shares of stock at \$10.00.....	70,000
	<hr/>
	\$1,028,300

On the same date the company's investment was as follows:

Real Estate	87,500
Plant and Buildings	272,054
Mains	192,114
Services	41,662
Meters	31,328
Cash	173,873
Supplies	35,249
	<hr/>
	\$833,780

Q. Did you take these figures directly from the books and records of the Metropolitan Light & Power Company and from your own personal inspection of them?

A. I took these figures directly from the books and records of the Metropolitan Light & Power Company and from my own personal inspection of them, yes sir, with the exception of the item of plant and buildings. The records did not show that completely.

884 It was necessary to estimate some part of that, amounting to about \$40,000. The records showed approximately \$230,000 odd, and omitted some items which we knew to be there and it was necessary to appraise that part of it; the amount estimated is very slight.

Q. With reference to the item of "real estate," how was that figure obtained?

A. That was the actual price they paid for the block they bought; they carried it on their books at that time and subsequently at \$200,000, but this was the actual amount paid for it.

Q. You may now proceed, Mr. Ryan.

A. (Continuing:) The difference, \$194,520, may be greater than that actually incurred in operating losses, coke experiments and the destructive effects of the fire, but it is probably a conservative measure of costs incurred by the company, including deficits in fair return prior to the year 1906. While the sum of \$1,028,300 was probably a fair measure of the cost of launching such a gas industry in 1905, the smaller sum, of \$833,780, must certainly be a minimum value for it.

Complete and fully detailed operating statements for the years 1906 to 1911 inclusive have been analyzed and condensed statements are submitted herewith (pages 66 to 69) in which the original figures have been used with a few slight modifications and adjustments to render the totals comparable with other data used in this study. Earnings were taken as stated, the company's portion of an adjustment of an excess rate collection extending through parts of three years being applied to the year in which the award was made
885 and actual possession of the money accomplished. General and administrative expense, carried on the books entirely as an operating charge, has been partly apportioned to capital in accordance with present day practice on a basis that is believed to be a reasonable interpretation of the book entries. A summary of plant betterments, to which these General Expense items have been added, has been compiled and from the yearly totals an estimate of annual depreciation requirements, based upon the 4% sinking fund formula, has been computed. Values applied to property accounts do not include interest during construction, but as this item is covered in the operating statement and as the deficits are added to the capital account, the same result is attained. The company's interest payments on its bonds and notes, with a provision for amortizing the discounts on bonds sold, averaged 8.02% annually on the cash realized from their sale. A return of 8% on the value of the physical property is, therefore, assumed to be reasonable under the circumstances.

An operating statement similar to that of the proposed comparative plant has been compiled and shows accumulated development deficits at the time of sale amounting to \$247,320, which equals 16% of physical property values, or \$28.82 per consumer. On account of the extremely low price at which the company was enabled to purchase fuel oil, this amount is much less than under conditions prevailing at any other time in recent years. Oil was then purchased at 42 cents per barrel, while the company's competitors were paying 65 cents to \$1.00 per barrel.

The company sold its property on December 11, 1911, to the San Francisco Gas and Electric Company for the following consideration:
886

Bonds assumed by purchaser (5% bonds).....	\$1,368,000.00
Bonds sold for cash to complete purchase (90% of \$750,000)	675,000.00
Cash paid.....	176,250.00
Cash paid on current liabilities.....	57,156.67
Total security Liability.....	2,276,406.67
Less Physical Values.....	1,684,643.00
Liability excess over physical values.....	\$591,763.67
	35.2%

This enterprise, with a life which, by eliminating the period involved in its coke manufacture, may be stated as seven years, developed a property and business that, at its conclusion, represented the following values:

Capital Invested.

Cash realized from Bond Sales:

102 bonds sold at par.....	\$102,000
179 " " " 70	125,000
375 " " " 80	300,000
624 " " " 85	531,400
45 (Legal, Organization) (Say at 80).....	36,000
300 bonds sold at 95	285,000
	<u>1,379,400</u>

(Av. 84.89)

(Those bonds, i. e., the 45 bonds, were issued to a firm of lawyers and financiers for the management and operation of the property and the development during its first three years; the record I have been able to get of it made no statement as to whether there was any discount contemplated in its issue.)

887 Stock sales:

7000 shares at 10.00.....	\$70,000
4445 " " 12.50.....	55,562
	<u>125,562</u>
Notes	248,000
	<u>373,562</u>
Total Investment.....	\$1,752,962
Increased Realty Values.....	138,500
Development Deficits.....	247,320
	<u>385,820</u>
Investment Value, Dec. 11, 1911.....	2,138,782

Mr. Searls:

Q. How was that determined?

A. Determined by a valuation at the time of the sale in 1911.

Property values:

Physical Plants (See details p. 69)	1,546,143	
Increased Realty Values	138,500	
Development Deficits	247,320	
	<hr/>	1,931,963

Sale value:

Bonds assumed by purchaser \$1,368,000 at 85	1,163,000.00	
Cash	750,000.00	
Liabilities Assumed	57,156.67	
	<hr/>	1,970,157
		<hr/>

Physical values:

Cost of Plant	1,546,143	
Increased Realty Values	138,500	
	<hr/>	1,684,643

Sale consideration (Bonds at par)	2,276,406
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Excess Liabilities over Physical Values	591,763
Ratio of Excess to Physical Value	35.2%
Excess Sale Value over Physical Property	285,514
Ratio to Physical property	17.0%

888 Mr. Bosley:

Q. When you say "Excess Sale Value over Physical property" have you included in the physical property the development deficits?

A. No, that is in property values.

Q. What figures do you use to obtain that?

A. Subtract the \$1,684,643 from \$1,970,157.

Q. You deduct the physical values from the sale values?

A. Yes.

Q. That is, assuming that the \$1,368,000 bonds were issued at 85?

A. Yes; that is the price at which the 675 bonds were sold to complete the purchase, as shown on the previous page.

Q. Those were general and refunding bonds that were sold to complete the purchase; they were no part of the \$1,368,000?

A. No.

The Master:

Q. The \$1,368,000 was the average of the prices at which the bonds you have up above there were sold?

A. Yes. The general and refunding bonds were sold at that time and I assumed that they had virtually the same security behind them.

If the excess value of the consideration over physical property is

the proper measure of going concern in this case and if the ratio that this excess bears to physical property is applied to the San Francisco gas property, the resultant value will be \$2,536,748. If the Metropolitan Company's development cost per consumer, \$28.80, be applied to the 113,300 gas consumers of the Pacific Gas and Electric Company in San Francisco, it would indicate a going concern value of \$3,263,040.

The history of this system very clearly covers just such a condition as that which a comparative plant theory should be designed to meet, and its success as an operative enterprise is credible evidence that its books should afford a reasonably correct basis for determining the cost of developing a profitable gas business in San Francisco under existing and recent conditions. This evidence is materially strengthened by the fact that the property was actually sold for a consideration almost identical with the values reached by adding to the investment the accumulated development deficits shown by the records; that is, the value of this property as evidenced by a sale by interests willing but not obliged to sell to purchasers willing but not compelled to buy, confirms the values determined by applying the theory used in the appraisal of the larger property.

It should be noted in this connection, however, in addition to the fact that the company occupied only the most desirable part of the city for the development of a gas business, that two exceptionally favorable considerations were of tremendous help to the enterprise and resulted in a much lower development cost than has been found in many other similar systems. The first of these was that at the beginning of operations the company entered into a long term contract for the purchase of fuel oil at the phenomenally low price of 42 cents per barrel delivered at their works; the second was the increase in rates obtained in 1909 which provided an immediate increase in earnings and thus materially shortened the unprofitable period.

890 Sales of California Public Utility Properties.

(N. B.—Under this subtitle in plaintiff's Exhibit No. 46 as read by the witness, there was a section consisting of two typewritten pages in which the witness set forth certain facts with respect to eleven sales of public utility property which had been approved by the Railroad Commission of California. The facts with respect to these sales had been compiled by the witness from the published decisions of said Railroad Commission and the conclusions of the witness with respect to those sales were, except in two or three instances, based on the recitals contained in those decisions. This section was stricken from the record by the Master in Chancery on objections made by counsel for defendants.)

891 The physical property of the Metropolitan Light and Power Company, including real estate, had a value at the time of its sale, of \$1,727,393, or approximately 26.94% of the valuation placed upon the eleven utilities involved in the foregoing transfers. If we may assume that present day practice would approve capitaliz-

ing the Metropolitan properties in the same manner, and that the securities would have a market value equal to those of the Pacific Gas and Electric Company, the transfer would involve issues with the following face and market values:

Securities.	Par value.	Market value.	
		% of par.	Amount.
Bonds	\$1,585,494	96.58 %	\$1,531,270
Preferred Stock	265,515	91.	241,619
Common Stock	339,472	60.	203,683
Notes	86,361	100.	86,361
Cash	43,233	100.	43,233
	<hr/>		<hr/>
	\$2,320,075		\$2,106,166

It would appear from this that the purchase of the Metropolitan system, which involved the creation of a security liability of \$2,276,407, was effected in a manner and for a consideration well within the limits set by similar transfers made under public regulation.

The securities issued in financing a utility are direct obligations on the part of the property to those who created it and these obligations must eventually either be paid or be repudiated. The above comparison confirms the conservative character of the basic assumptions made in figuring development cost in the foregoing analysis, and shows that the financing of the Pacific Gas and Electric Company has been in accord alike with fair current practice and with transactions of other public utility properties approved by the regulatory body of this state.

892 Recapitulation: The results reached through the application of the various methods of computation to the system under consideration are as follows:

1. Cost of Developing Going Concern:

(a) Actual Cost.....	No Determination
(b) Reproduction Method.....	\$2,436,439
(Analysis, Pages 5-10) Computations pages 30-56)	
(c) Investment Method.....	4,779,092
(Analysis Pages 10-11. Computations pages 57-61)	

2. Value of Going Concern:

(d) Comparison of Net Earnings Method.....	2,340,880
(Analysis page 12. Computations pages 62-65)	
(e) Unified System.....	No Determination
(f) Approximations:	
(Analysis Pages 15-16)	
Gross earnings—1 year.....	4,055,000
Physical Values—20 %.....	3,000,000
Consumers—\$30.00 Each.....	3,399,240
(g) Market Value of Securities.....	3,208,560
Security Liabilities.....	5,182,545
(Analysis pages 16-18. Details page 71)	

3. Deduced from Other Evidence:

(h) From Metropolitan Light & Power Co.:

(Analysis pages 19-24. Financial statement Pages 66-69)

1. Development Cost, based on consumers.....	3,263,040
2. Development Cost, based on physical values...	2,387,528
3. Going Concern Value, based on sale price.....	2,536,748

(i) (Stricken Out)

Mr. Dailey:

Q. Those different theories you set up show very startling differences in result, don't they?

A. I would say very striking differences, I would not call them startling differences. Most of them can very readily be explained by reference to influences which have affected them one way or another.

Conclusion: The development of the gas industry in San Francisco has involved the expenditure of money by the Pacific Gas and Electric Company and the assumption of financial obligations evidenced by securities still outstanding. This development has provided comfort and conveniences and even the necessities of life to the people of San Francisco, and has been a vital factor in the industrial growth of the community. The expansion of residential suburbs and the consequent increase of realty values have followed, not preceded, the extension of its pipe lines. Having, through the expenditure of money, rendered a service to and created a value for the community, the existence and ownership of a value at least equal to the cost that would be incurred in reproducing this service seems beyond reasonable dispute.

The data used in the foregoing have been compiled with care from authentic sources and are believed to be authentic and reliable. In deducing therefrom a reasonable valuation of the going concern, which evidently lies between \$5,200,000 and \$2,340,000, each method of determination has been weighed in the light of its proper application to the property under consideration and the conclusion reached that the appraised value of physical structures should be increased by the sum of \$3,000,000 to cover the cost of development and value of the enterprise as a going concern, and the further sum of \$150,000 to cover the expense of organization and promotion.

(N. B.—The text of said Exhibit No. 46 ends here. But, attached to and forming part of plaintiff's Exhibit No. 46, there were several tables and charts showing in detail and illustrating the statistics and computations which constituted the basis of the conclusions expressed by Mr. Ryan in said statement. These tables and charts were explained at length by the witness. It is not, however, deemed necessary to insert in the transcript of the record for use on appeal either the tables, charts or testimony explaining the witness' computations in detail.)

Having read said statement, the witness proceeded to testify as follows:

Referring to the recapitulation near the end of the statement which I have just read, I am inclined to attach the most weight to the first estimate shown in subdivision (g) based on "market value of securities," viz., \$3,208,560. The second in importance is the estimate based on cost of development under the reproduction method, subdivision (b), \$2,436,439. The third in importance is subdivision (d), "comparison of net earnings," \$2,340,880. The fourth place in relative importance I assign to the three items which are grouped together under subdivision (h), based on the Metropolitan Light & Power Company analysis, ranging from \$2,387,528 to \$3,263,040. Next in order of importance is the sub-heading (i), the sale of eleven utilities, and with it the second item under the sub-heading (g), "security liabilities," and the estimate
895 based on the investment method of the comparative plant, under subdivision (c). The last in the ratio of credibility I place the approximations grouped together under the sub-head (f). The reason for that classification is largely that the very best evidence of value we have is what purchasers and sellers agree on as a basis of price. We have that under the market value of securities. I place below that the cost of development under the reproduction method because that in my judgment has been somewhat impaired in its evidentiary value by the data that it is based on. We have used to a very large extent the Metropolitan Light & Power Company's records. Their development of that property was, as I have stated, under very favorable conditions; they had a fuel contract that never has been equalled in the area around the bay here; they also occupied not the entire territory we are considering here, but that which was most favorable to their development. The third item I have considered here, the value of going concern by a comparison of the net earnings, is affected by the same consideration that would tend to cause the development costs under the reproduction method to give a low figure. For that reason, I have been inclined to raise both of those determinations and use something nearer the figure determined by the market value of the securities. Taking
all these into consideration however, and in view of the fact
896 that each one of the properties that we have considered, as well as the theoretical comparative plant, would be under the necessity of assuming obligations considerably in excess of the physical value, and that these obligations would have to be worked out at sometime either to a condition of permanent stability or to a state of disappointment on the part of the people who assumed them, I think that we are warranted in considering the value of the going concern at \$3,000,000.

The Master:

Q. Mr. Ryan, you have commented on these different methods, and, if I remember your comments, they have been chiefly directed to particular facts that affected the different methods. From your

study of these different methods of computing this element of value, have you any criticisms to offer on the different methods? I ask you that because you are not advising the Pacific Gas & Electric Company, you are advising me. I mean as methods, do you discern comparative weaknesses or comparative elements of strength? You referred to your opinion of the market value of the securities method.

A. The criticism that naturally forms in one's mind is that considerations of cost are not at all conclusive as a measure of value. For that reason I have been inclined to question all determinations of going concern value based on cost.

Q. That is, on development expense?

A. On development expense, which, when based on actual records, represents investment. The reproduction method assumes a great many conditions that would attend the development of a
897 property under the conditions that we assume for the reproduction of the physical system. In that respect it is contrary to actual experience and is not supported in some ways by any experience that we could apply to it.

We cannot conceive, for example, the existence of a city the size of San Francisco entirely without gas or not familiar with the use of gas. In advancing that theory I had in mind the existence of the two plants already which partially familiarized the people with the use of gas; this development of a comparative plant had been the substitution of a better service for the one already existing and a larger and more responsible and stable industry for the two smaller ones that had previously existed. The only alternative for that that I can see in the application of a reproduction method for going-concern value would be to assume that the city existed without a gas service and for that reason you would have to imagine all the development and experimentation and invention that has attended the gas business for one hundred years have been compressed within the scope of the development period; that would involve assumptions that would be incredible and could not be translated into actual figures. For that reason I have not been very favorably inclined to the reproduction method. It has essential weaknesses that you cannot very well get around. There are criticisms directed to it on account of the assumptions that you must necessarily make and that you have no experience to justify. I have done the very best I could under the circumstances with the application of the theory, but it
has that element of weakness. That does not apply to the

898 determination of value based on the market value of the securities outstanding. The same thing is true in determining the value of going concern on the comparison of net earnings; any difficulties that apply to the assumptions taken into consideration in the development cost under the reproduction method must be carried over into the comparison method because the comparison embodies exactly the same factors. The only thing is that in the comparative net earnings method you are making an effort to determine values by a comparison of an existing plant with a hypothetical one and you at best embody assumptions that we don't always have experience to support. For that reason I have been inclined to attach

the highest value to the evidence of market value. We have there actual sales of partnership interest in an enterprise. It is a bit of evidence that is based on innumerable transactions in a large enterprise and over a long period of time and where the permanency of the investment and the stability of the enterprise are generally fully taken into consideration. It comprises practically every element of value that would be considered by an investor, by a speculator, in shaping his course of action in connection with it.

899 Mr. Dailey:

Q. You would have a very varying going concern value if it were dependent on the rise and fall in the market value of the stock, would you not?

A. I don't know of anything else but the price of steel rails that has been similarly influenced; and we certainly have the price of wheat and other commodities in mind right now, Mr. Dailey, and we know we can get no more loaves of bread out of three dollar wheat than we can out of 50-cent wheat, but in our own memory we can reach both extremes.

In response to further questions by Mr. Dailey, the witness said:

I have made a valuation of the property of the Northern California Power Company for J. G. White & Company and I have made a study of its development cost also. Just before the California Public Utilities Act went into effect in 1912, the common stock of that company was selling at \$67.00 per share. Within the last two or three years it has been selling around eight and ten and twelve dollars per share and as low as four dollars. If you take those market values you would have an extremely varying quantity. The point brought up is one that ought to be very thoroughly emphasized. There are no hard and fast rules that you can apply indiscriminately to all properties. In applying that particular rule to that particular company, anyone making a study of it must go into the influences that caused those fluctuations. You would find that there was some inside power there that wanted a high price for that stock and it was manipulated on the market.

900 The sales at \$60.00 or \$65.00 were not the normal effect of barter and sale between interested parties. For a number of years this stock referred to was over \$50.00 per share and paid dividends. There were outstanding 100,000 shares of common stock, having a par value of ten million dollars. The difference between \$6,750,000 and \$1,000,000 representing the market value of this stock at different times is very great, but the company had lost none of its properties.

For a short time there was competition that destroyed some of the Northern California Power Company's custom. The Sacramento Valley Power Company was the competitor. Later this competitor's properties were purchased at a very high cost. The price paid was about \$855,000 in money, the purchaser assuming the vendor's bonded indebtedness. The purchaser acquired some additional prop-

erty, the value of which was not equal to the amount paid and the obligations assumed. The purchase of the Sacramento Valley Power Company really caused an increase in the value of the Northern California Power Company's stock for a while. I would say very emphatically that I would not have used the market price of the stock of the Northern California Power Company as a basis for determining the value of its property as a going concern at any time.

The stock of the Northern California Power Company was at \$15.00 a share when I made the valuation of its physical property. The conditions which applied to the Northern California Power Company did not in my opinion exist with the Pacific Gas & Electric Company.

901 Direct examination of the witness by the plaintiff's counsel was here resumed, and the witness testified as follows:

The fact that a company is possessed of a well-established business and is making earnings sufficient to enable it to pay, and is in consequence properly paying interest on its outstanding bonds and dividends on its outstanding stock, is really an important factor to be taken into consideration in determining whether or not the market value of the securities is a proper index of the value of the company's property as a whole. Also the volume of the transactions in its securities is very important. If the stock and the securities of the company were very closely held by a few individuals, it would be much more easy to manipulate the market by sales between interested parties than it would be if the securities were of very large amounts and were very widely distributed. That is another factor to be taken into consideration in determining the weight that should be attached to the market value of the securities.

The conditions just mentioned, that is, established earnings, the payment of dividends, the payment of bond interest and the very wide distribution of the stocks and bonds of the company, are conditions that actually exist in the case of the Pacific Gas & Electric Company and in addition the securities of that company have been widely known and freely traded in over a long period of time.

My impression is that the stock of the Northern California Power Company was originally issued to the incorporators and the
902 promoters of the company without any consideration being paid for it and that it has been very extensively manipulated in the local market and throughout the Sacramento valley. Just how long it paid dividends (which I don't think amounted to such a great sum) I don't remember. The assessments that have been levied on the stock since that time amount to more than the dividends that were declared. The assessments probably forced the stock down to eleven, twelve and as low as four dollars a share.

Referring to the statement read by me (Plaintiff's Exhibit No. 46) I desire to add that the assumptions involved in the reproduction method would seem to me to make that basis of computing going concern less applicable to the plaintiff's property than the one I prefer, namely, the market value of securities. The same observation would apply with equal force to any determination of value of any

property, physical or otherwise, based on the reproduction method. It is necessary in either case in the employment of the reproduction method, to assume conditions that do not and have not existed, but it is the only basis upon which we can get at a valuation at all in some cases. The method has to be followed with that limitation, which in the absence of any better method does not impair its value.

As a basis of comparison, I prefer actual evidence of sale and actual evidence of investment to a theoretical cost of duplication. Referring to Pages 17 and 18 of Exhibit No. 46, it appears that the value of

903 the entire physical property of the Pacific Gas & Electric Company as determined by J. G. White and Co. at December 31, 1911 was slightly in excess of \$69,000,000. The additions and betterments (plus the work in progress and the working capital) installed between December 31, 1911 and December 31, 1915 amounted to more than \$29,000,000. In addition to that there were property elements included in the White valuation that were replaced by other structures between the dates mentioned, the cost of which was between \$8,000,000 and \$10,000,000. My figures for the cost of the additions and betterments were taken from the Pacific Gas & Electric Company's records. My figures also brought in what may be classified as "Current Assets," that is, materials and supplies, and money on hand, and other things of that sort as of December 31, 1915, and also construction work in progress. This valuation made as of December 31, 1915 would, I believe, remain practically stationary during the period that we are here concerned with, although values continually fluctuate.

The variation in the number of consumers and the amount of the investment during the period beginning July 1, 1913 and ending June 13, 1915 would not be sufficient to make any great difference in my estimate of the going concern value. Any such difference would not exceed 10%. It would be somewhat less than the difference in estimates based on the approximations of the Rule-of-Thumb methods.

I do not know how the rule-of-thumb methods have been evolved. They have grown up with the business. Engineers do not agree on the application of these methods.

904 I think it should be emphasized that there are no rules which would apply generally to all elements of property or to all characters of property as a basis of valuation. I have not intended to work out any general rules applying to property indiscriminately in this case for I do not believe it can be done. In my opinion no property can be made the subject of valuation on the basis of the application of a general rule. A valuation must be arrived at by making a careful study of the property, of its business, of the community it serves and the economical and financial conditions that surround it.

The character of the community in which a utility operates is of importance; that is whether it is a stable and well established community, or a community that is variable—engaged in enterprises that are largely speculative and where conditions may change suddenly.

I think in any transaction involving the transfer of a property, the net earnings are almost the first element given consideration. Throughout the entire deal the net earnings are constantly examined and scrutinized. Their permanency is calculated and every effort is made on both sides to determine to what extent the net earnings may be relied upon in the future to continue to support the values given.

In answer to the question put by counsel for the defendant, "If the supervisors of San Francisco had allowed the Pacific Gas & Electric to earn very high net earnings it may readily happen that the going concern value would run up so high that it would make the rates immediately confiscatory?" My reply is "I do not think so."

As a matter of fact only during a small portion of the time covered by this exhibit (No. 46) were the rates fixed by the Supervisors. From these considerations I conclude that rates somewhat naturally adjust themselves.

The utility had cut the rates prior to the beginning of this period with which we are concerned and I believe maintained them up to shortly after the beginning of the period when they were increased. Later they were reduced to the ordinance rates of 1912 to 1913. Then an injunction was brought against the ordinance rates and a higher rate collected by the company.

I have tried to base my conclusion as to going concern value on all the information relating to value that I could gather.

In submitting to you this information and the methods of determination that I have found possible to apply to the property in question, I have been mindful of some of the weaknesses of the assumptions on which they are based. The fact that a circular effect results from arguing from earnings to values, and from values back to earnings, does not disprove the fact that the main evidence of values that we have is invariably associated with earnings. We cannot escape the fact that the value of a property that has a small amount of net earnings is seriously impaired, and that a property that has a satisfactory volume of net earnings has value. I think that it is possible to consider that evidence and give it the weight to which it is entitled without carrying it to the absurd extent of making it a circular process.

Suppose the rates fixed by the regulating body, the Board of Supervisors or the Railroad Commission, at a given time were very high. The person contemplating either the purchase or the sale of a public utility property would take into consideration the fact that those rates were so high that there would be a probability of the rates being reduced as a result of a further investigation and study of the entire matter. On the other hand there have been occasions in this state when utility properties have been sold where the rates were low, and where the condition was regarded by investors as temporary, because an increase in rates was warranted. The purchases were made with the expectation that an increase of rates would be effected and net earnings brought back to a point where the investment would be considered reasonable. Just such

a situation exists in the case of several properties, among them the California Telephone and Light Company. Efforts to have the low rates of these properties raised have been carried on very continuously and I believe will be successful.

A prudent man, well versed in the business, in attempting to form an estimate of the value of a public utility property with a view either to its purchase or its sale would consider the general economic situation in the community where that public utility was operating and would form a judgment as to the reasonableness of the rates that were charged and would consider the factors that might bring about either an increase or a reduction of the rates.

In connection with the temporary nature of net earnings; if the utility is well organized and properly developed an excessive net earning or an inadequate net earning must necessarily be a
907 temporary condition and should be given weight by an investor accordingly. If net earnings are inordinately high they cannot be regarded as a permanent factor in the operation of a utility because competition would spring up and rates would thus be regulated downward. If the earnings are inadequately low, it is the function of the utility to bring about an increase, and if conditions are normal that can be readily obtained. Consequently I do not think that extremely low net earnings would entirely wipe out the element of going concern value, or that extremely high net earnings would establish an excessive going concern value, because both conditions would be temporary.

You can readily see the force of the above reasoning in the condition of the stock market at the present time. Not necessarily as to utilities alone, but also in the case of some industries that were actually stimulated by the war conditions and which at the present time are earning enough to pay fifteen or twenty per cent dividends on the cost of an investment in their securities. The investing public has not accepted that condition as permanent and the securities are not selling at the price they would if the high earning condition could be regarded as permanent.

With reference to Page 71 of my Exhibit (the page describing the securities outstanding of the Pacific Gas & Electric Company, under the heading "Market Value 1916"), the determinations there shown were taken from stock market quotations on all the securities then
908 actually dealt in in the local markets. Wherever a figure is given above par it is supported by an actual sale within a few days of January 1, 1916, and the same is true where the figures are below par. Those figures could not be said to be typical of the entire year 1916 as there was a steady increase in prices during that year. At the end of the year, for example, the common stock issues, the last items there, were selling in excess of 65% of par. The figures, perhaps, would be more typical of 1915 than of 1916. In 1914 the Common Stock of the Pacific Gas & Electric Co. was down around \$50.00 and sometimes below.

I have made a further study of the market value of securities of the Pacific Gas & Electric Company as a guide to the value of said Company's gas properties and business as a whole in San Francisco.

This study is in the nature of a review of some information used in the preparation of the data given in Exhibit 46 and is a further analysis of some of the security issues that are applicable particularly to the San Francisco gas properties. The data were obtained in large part from the exhibits already presented in this case and for the rest, the source of my information was the statistical information submitted in the Railroad Commission case, and I believe, in some other proceeding before the Commission on behalf of the Company. The statement of stock issues was made by Mr. Hockenbeamer and filed with the Railroad Commission in accordance with law. It is possible to determine from the original issues of securities almost exactly what securities were issued in the financing of the purchase and the construction of the San Francisco gas property as it now exists, and what securities are now outstanding from those issues.

909 The San Francisco Gas & Electric Company, the predecessor in interest of the Pacific Gas & Electric Company, in the gas business of San Francisco, was organized in 1897 and acquired the property and business of the San Francisco Gas Light Company and the Edison Light & Power Company. The securities issued at that time in the financing of this new enterprise were as follows: The incorporation required 11 shares, one for each director. \$10,000,000 par value of stock was given to the holders of the San Francisco Gas Light Company Stock. The San Francisco Gas Light Company had an outstanding capitalization of \$10,000,000 par value of stock and no bonds.

The property of the Edison Light & Power Company was acquired through an issue of \$2,750,000 of stock and the assumption of \$800,000 in bonds. During 1897, \$100,000 par value of stock was sold for cash, largely to pay the indebtedness of the Electric Company and that stock may be classified as electric. 148 of the 800 bonds outstanding of the Edison Company were refunded by an issue of \$197,333 par value of stock of the San Francisco Gas & Electric Company,—that being solely an electrical transaction. There were no further issues of securities for the San Francisco Gas & Electric Company until 1903 when the Pacific Gas Improvement Company was purchased through an issue of \$2,800,000 par value of stock and the assumption of \$1,190,000 par value of bonds. That being solely and exclusively a gas transaction, those securities are assignable to gas. In the same year the Independent Gas & Power

910 Company and the Independent Electric Light & Power Company were purchased. We have no exact segregation of the securities issued in each case, but we have the balance sheets of the Company showing the property values at that time and the purchase price of \$6,954,000 in bonds that were issued in effecting those purchases which may be segregated between gas and electric on the basis of relation of the property values as shown by the balance sheet, giving \$2,111,000 to gas, and \$4,043,000 to electric. That is treating \$5,000,000 of the bonds at par and the balance at \$95.00.

In the same year the Equitable Gas Light Company was pur-

chased for \$708,000 in cash, the cash being obtained from the sale of the bonds of the San Francisco Gas & Electric Company, it requiring \$746,000 in bonds to produce that amount of money. That is entirely a gas transaction and we classified those bonds as gas securities.

During 1904 there were 29 bonds of the Edison Light & Power Co. called in and cancelled and an equal number of San Francisco Gas & Electric Company bonds were issued in place of them, that being an electric transaction entirely. In the same year there were forty-one (41) bonds of the Pacific Gas Improvement Company converted into San Francisco Gas & Electric Company bonds at par. Whatever differences there were in the sales of one and the purchases of the other were taken care of through the surplus.

911 In 1905 the Pacific Gas & Electric Company bought practically all of the stock of the San Francisco Gas & Electric Company with the proceeds of an issue of General Mortgage & Collateral Trust Bonds and 6% Debentures. We have the segregation between gas and electric departments of stock of the San Francisco Gas & Electric Company and I have made exactly the same pro ration of the bonds issued in acquiring this stock. This stock was purchased at \$90.00 per share, \$65.00 being paid from the proceeds of the General Mortgage & Collateral Trust Bonds and \$25.00 from the proceeds of the sale of debentures. On that pro ration the General Mortgage & Collateral Trust Bonds will be divided, \$8,204,500 to the gas department and \$1,936,380 to the electric department. The debentures, \$3,169,000 to the gas department and \$734,000 to the electric department.

Between 1904 and 1911 there were additions and better-
912 ments to the gas and electric properties in San Francisco amounting to somewhat less than \$6,000,000 in the financing of which \$1,258,000 par value of bonds of the San Francisco Gas & Electric Company were issued. That did not by any means defray the entire cost of the additions and betterments, but the money was used for that purpose. I have divided \$1,258,000 between gas and electric according to the ratio between the additions and betterments of the two departments during that period. There were something over \$4,000,000 of electric additions and betterments, and \$2,000,000 of gas, giving \$857,000 of those additional bonds to the electric department and \$401,000 to the gas.

From 1904 to 1911 there were \$600,000 in bonds of the San Francisco Gas & Electric Company retired through the operation of a sinking fund. I have taken those from the gas and electric departments in the same proportion that the total issues previously assigned to those different departments bore to the total, that is, taking \$354,000 from electric and \$246,000 from gas. There were retirements of the General Mortgage & Collateral Trust Bonds and the debentures also during the same year and I have subtracted from the issues allotted to the gas and electric departments the proportion of the amounts retired in exactly the same ratio previously assigned to them. That would make the General Mortgage & Collateral Trust, \$1,371,200 of the gas department and \$321,680 of the electric de-

partment. Of the debentures \$53,000 assigned to the gas were retired and \$12,575 assignable to the electric department.

913 In 1907 the Company found the sinking fund requirements on the debentures amounting to \$400,000 a year, burdensome and very difficult to meet, and they were converted into a similar issue of debentures bearing the same rate of interest and having the same par value without the sinking fund requirements. The exchange was effected through an issue of common stock of the same par value as the debentures. In other words, in order to get the consent of the holders of the debentures to a reissue without sinking fund requirements, it was necessary to give them an equal issue of common stock. That is divided between gas and electric in the same proportion as the debentures were divided, \$3,169,000 going to the gas department and \$734,000 to the electric.

During the years 1905 to 1911 \$133,000 par value of bonds of the Pacific Gas Improvement Company were retired and bonds of the San Francisco Gas & Electric Company in the same amount were substituted, being merely a conversion and leaving the total figures unchanged.

In 1911 the Pacific Gas & Electric Company called in the General Mortgage & Collateral Trust Bonds and the debentures then outstanding and paid them in cash. Payment was in 1912, the whole transaction taking several months to complete. The deal was financed through an issue of General & Refunding 5% bonds of the Pacific Gas & Electric Company. That issue has been segregated between gas and electric on the same ratio as the gas and electric segregation of the General Mortgage and Collateral Trust bonds and debentures was made. The result of that conversion was to leave \$11,607,900 of the General & Refunding Bond chargeable to San Francisco Gas properties and \$2,746,100, chargeable to electric properties.

During the latter part of 1911 the Metropolitan Light & Power Company was purchased. The Company had outstanding \$1,368,000, in bonds which were assumed by the Pacific Gas & Electric Company. The remaining part of the purchase price was paid in cash, of which, part was obtained through the sale of \$675,000, in General & Refunding Bonds of the Pacific Gas & Electric Company. Those securities are assignable to gas.

In 1911 the Company issued a Common Stock dividend of 50% of the Common Stock then outstanding. I have taken the amounts of Common Stock previously allotted to the Gas & Electric Departments through the conversion of the debentures in 1907 and have added to it 50% as a result of that Common stock dividend of 1911. There was another common stock dividend authorized by the Railroad Commission in 1915 of 6% and I have made the same conditions apply to the amounts allotted to the gas and electric departments that year. The common stock had been issued through the conversion of the debentures, and for that reason was applicable to the San Francisco property. It has been increased by these two common stock dividends.

In 1905, in the financing of the Martin station construction, the

United Gas & Electric Company issued \$850,000. in bonds. The total cost of that plant was about \$1,500,000. but a refund of about \$325,000. was effected on the electrical equipment. There is
915 no exact basis for determining how much of the \$850,000. in bonds is chargeable to gas and how much to electric. I have split them half in half and I think that is fairly close to it. That leaves \$425,000. to gas and \$425,000. to electric.

During the years 1912, 1913, 1914, and 1915 the company made considerable additions and betterments to both the gas and electric departments in San Francisco. Some were financed through earnings, some through the issuance of short term notes and other paper, and others through the issuance of General & Refunding Bonds and First Preferred Stock. I have assumed that the temporary certificates, notes and other indebtedness of that kind were ultimately converted into General & Refunding bonds or first preferred stock, and have assumed that the additions and betterments in the gas department in 1912 and 1913 were ultimately financed through General & Refunding bonds at 85% of par value and in 1914 and 1915 through first preferred stock at 82½% of par value. This gives an issue in 1912 of \$1,096,000. of General & Refunding Bonds chargeable to gas; in 1913 an issue of \$440,000. of General & Refunding bonds chargeable to gas; in 1914 an issue of \$375,000 of First Preferred Stock chargeable to gas; and in 1915 an issue of \$354,000. of First Preferred Stock chargeable to gas. All these issues are at par.

In 1912 there were \$321,000. of Pacific Gas & Improvement bonds converted into General & Refunding bonds of the Pacific Gas & Electric Company on the par for par ratio. The difference
916 between cost and the issued price was taken care of in the surplus.

In the period of 1911 to 1915 there were a number of securities retired or purchased by the sinking funds of the different issues. The total for the Pacific Gas & Improvement Company's bonds so retired, being \$187,000. Of the San Francisco Gas & Electric Company bonds, \$265,270. were chargeable to gas, and \$381,730 chargeable to electricity. There were two issues of these bonds, part of them being taken care of by the sinking funds and cancelled entirely, and the others being left alive in the sinking fund temporarily, the interest accumulating in the fund. Of the General & Refunding 5% bonds, \$401,600. were retired that were chargeable to the gas department and \$124,700. chargeable to the electric. Of the Metropolitan Gas bonds \$163,000 have been retired. Of the United Gas & Electric bonds \$194,000. have been retired. I have divided these half and half between gas and electric.

This method of apportioning various securities issued during that period and including those that were converted from one type of security to another and those retired, leaves on December 31, 1915, \$37,583,600. par value of stocks and bonds, of which \$22,026,130. are directly and exclusively chargeable to the gas department, and \$6,500,900. in stocks and bonds that are partly chargeable to the gas department, and partly to the electric department. Of the \$6,500,000., the method of apportioning we have used assigns

\$2,552,600. to gas and \$3,948,300. to electricity. That makes a total issue of \$24,578,730. par value, reasonably issued in the purchase, construction and financing of the San Francisco gas properties. Taking the market quotations as of June 30, 1914 or the sales as of that date, we get the market value of those securities at \$19,501,275.

On December 31, 1915 (which is the basic date that is used in Exhibit 46 in connection with security values) the market value is \$21,172,184. I have also taken the securities as shown on the stock market reports of June 1, 1917, and substituting the bid price for the selling price on that date, for three of the issues of which there were no sales, the value comes to \$20,647,100.

This is an effort to determine just what securities were actually issued in financing the San Francisco gas department of the Pacific Gas & Electric Company. I believe the other method of segregation, or the method of apportionment, used in Exhibit 46 is a firm basis for determining the security valuation of the San Francisco gas property; because the value of these securities is in a large measure a matter of the value of the business of the entire enterprise of the Pacific Gas & Electric Company. We cannot very well localize the San Francisco Gas business and say that it is a separate and distinct activity of the company for it is a part of the general scheme of service. The securities issued on one part of it, even though they may have been originally issued as a purely local security, when the system is merged in one large enterprise, all become general securities and all have value attached to them due to the profitableness of the Company's entire activities.

This method of apportionment I have just stated, is a method which gives us ultimately not only the value which attaches to the San Francisco property, but also that portion of the value which inheres to these securities through the merger into the system as a whole. For that reason, although I had this information with the exception of the computation of the value on June 1, 1917, I did not incorporate it in the original figures. I believe that it is of interest in connection with it and should be carefully considered.

In my opinion a comparison of the San Francisco gas business of the plaintiff and its gross business on the basis of the gross and net revenue affords a reasonably satisfactory method of determining the relation of the market value of securities to the property.

The basis of segregation used in Exhibit 46 was on the physical values as we have been able to determine them. It is obvious that the security issues were largely made in the construction of the physical property. I had that idea definitely in mind in making the segregation in Exhibit 46. It is unquestionable that the value assigned to securities by an investing public and by the stock market in general is based almost entirely on earning power.

Segregation on the basis of gross and net earnings undoubtedly has great merit. Very often in long term securities, the original property built from the proceeds of the sale of the securities entirely vanishes. For example, we will have in a very short while no tangible results from the issue of the \$850,000. of the bonds of the

United Gas & Electric Company for the construction of Martin station. The securities will still be outstanding and will still
919 have value. Value will attach to them because of earnings and will not get the support of the physical property, although it was actually built. Therefore I am inclined to regard segregation on the basis of gross and net earnings as very clearly applicable to the values of the securities.

In Exhibit 46, I have assigned to the San Francisco Gas Department 15 9/10ths per cent of the entire value of the outstanding securities of the plaintiff.

(N. B.—Mr. Ryan's direct examination was interrupted for the purpose of introducing evidence with respect to plaintiff's gross and net income during the calendar years 1913, 1914, 1915 and 1916. This evidence was given by plaintiff's general auditor, Mr. M. H. Bridges.)

Mr. M. H. BRIDGES, recalled for the plaintiff testified in substance as follows:

I have ascertained the gross income from all sources of the Pacific Gas & Electric Company during the calendar years 1913 to 1916 inclusive. I have also ascertained the net income of the Pacific Gas & Electric Company from all sources during the same period of time. The term net income is here used to denote gross income less expenses of maintenance and operation, including taxes, and uncollectible accounts, but before any deduction for bond interest, reserves for depreciation, obsolescence and casualty or fire insurance. The gross income as here stated includes miscellaneous income from sources other than the sale of gas, electricity and water, and from
the operation of street railroads. The gross income of the
920 Pacific Gas and Electric Company, before any deductions for costs or reserves, and including miscellaneous income from other sources than public utility operations, for the year ending December 31, 1913, amounted to \$16,202,337.37; for the year ending December 31, 1914, \$17,220,503.69; for the year ending December 31, 1915, \$18,944,179.91; and for the year ending December 31, 1916, \$19,125,383.61.

Plaintiff's gross revenue derived from its San Francisco Gas Department business for the fiscal year ending June 30, 1913, as shown in Exhibit No. 38, was \$3,310,740.94. The ratio of that amount to the plaintiff's entire gross income for the calendar year ending December 31, 1913, is 20.41%.

The gross revenue as shown in Exhibit No. 38 from the plaintiff's gas business in San Francisco, including the amount collected in excess of the ordinance rates, for the year ending June 30, 1914, is the sum of \$3,689,858.22. The ratio of that amount to the gross income from the plaintiff's entire business for the calendar year ending December 31, 1914, is 21.40%.

The gross income from the plaintiff's gas business in San Francisco as shown by the Exhibit No. 38 for the fiscal year ending June 30, 1915, including revenue in excess of ordinance rates, is the sum of \$3,997,138.99. The ratio of that amount to the gross revenue

of the plaintiff for the calendar year ending December 31, 1915, is 21.12%.

According to Exhibit No. 38, plaintiff's gross revenue from its gas business in San Francisco, including revenue in excess of ordinance rates, for the fiscal year ending June 30, 1916, was the sum of \$4,163,065.30. The ratio of that sum to the gross revenue of the plaintiff for the year ending December 31, 1916, is 21.74%.

The net income of the plaintiff from all its business, before deducting reserves for fire insurance, casualty insurance, depreciation, obsolescence, and inadequacy, for the calendar year ending December 31, 1913, was \$6,721,352.26; for the year ending December 31, 1914, \$8,077,522.15; for the year ending December 31, 1915, \$9,671,685.10; and for the calendar year ending December 31, 1916, \$9,677,574.10.

As shown by Exhibit No. 38, the net operating revenue from plaintiff's San Francisco gas business, before deduction of reserves, for the fiscal year ending June 30, 1913, is the sum of \$1,093,286.09. The ratio of that sum to the corresponding net income from plaintiff's entire business, for the year ending December 31, 1913, is 16.27%.

The net operating revenue shown by Exhibit No. 38 from plaintiff's San Francisco gas business, before deduction for reserves, for the fiscal year ending June 30, 1914, including revenue in excess of ordinance rates, is the sum of \$1,584,793.20. The ratio of that sum to the corresponding net income of the company as a whole is 19.63%.

For the year ending June 30, 1915, the net operating revenue from the plaintiff's gas business in San Francisco as shown by Exhibit No.

38, including revenue in excess of ordinance rates, before deduction of reserves, is the sum of \$1,730,788. The ratio of that amount to the corresponding net income of the plaintiff from its entire business for the calendar year ending December 31, 1915, is 17.95%.

According to Exhibit No. 38, the plaintiff's net operating revenue, before the deduction of reserves, including revenue in excess of ordinance rates, for the fiscal year ending June 30, 1916, is the sum of \$1,890,889.99. The ratio of that amount to the net operating revenue of the plaintiff from its entire business for the year ending December 31, 1916, is 19.57%.

Mr. J. T. RYAN, recalled, testified as follows:

I have heard the testimony just given by Mr. Bridges with respect to the ratios between the plaintiff's gross and net income from its gas business in San Francisco and its gross and net income from its entire business. Each of those ratios is greater than the ratio, viz., 15.9%, which I used in Exhibit No. 46 to denote the percentage of the entire value of plaintiff's outstanding securities which I assigned to its San Francisco gas department.

The witness, Mr. Ryan, subsequently produced, and testified to its correctness, a statement which was admitted in evidence and marked Plaintiff's Exhibit No. 48. Of this exhibit, it is only necessary to incorporate here the first page, a copy of which is as follows:

Pacific Gas and Electric Company.

Security Values Segregated to San Francisco Gas District on Basis of Net Earnings.

	Par value outstanding.	Market value.	Ratio of net earnings S. F. gas to P. G. & E. total.	Proportion to San Fran- cisco gas based on net earnings.
Dec. 31, 1913.....	\$127,594,300	\$98,025,345	16.27%	\$15,948,724
Dec. 31, 1914.....	130,179,600	103,304,322	19.63%	20,278,599
Dec. 31, 1915.....	132,795,058	114,519,081	17.95%	20,556,175
Dec. 31, 1916.....	135,177,788	118,503,495	19.57%	23,191,134

924 On cross-examination, the witness (Mr. J. T. Ryan) testified in substance as follows:

I was employed in the construction department of the Los Angeles Gas & Electric Company in 1902 and 1903, and have been employed as Consulting Engineer by some four or five gas companies in the state during the last five years.

While I was working for J. G. White & Co., I was assigned to those companies in a Consulting capacity, largely in the matter of their rates and in some aspects of accounting.

While connected with the Los Angeles Gas & Electric Company, I was clerk in the office of the Superintendent of Distribution engaged in clerical work. While with J. G. White & Company, my work was to make a study of the books of the gas companies, in prescribing accounting methods in respect to both construction and the operation of properties, with particular reference to security issues and to the financing and rate making features of operation.

925 The work I did with the Los Angeles Gas & Electric Company was accounting. I was connected with the City Engineer's office in Los Angeles in the Bureau of the Los Angeles Aqueduct and there my work was largely on matters of accounting. While with the city of Los Angeles I was Chief Clerk in the Construction Organization of the Outfall Sewer in 1906 and also was employed in several capacities with the Los Angeles Aqueduct, being in the department that compiled the data that passed through the hands of Mr. Clemens. I had a good deal to do with devising the scheme of accounting that was in effect at the time I was there. My first employment was in the office of the Chief Accounting Officer, Mr. Nelson. I was later transferred to Field Work, where I was in charge of the headquarters at Mojave, managing the General Machine Shop there and the distribution of supplies from the general warehouse at that place. The official title I acquired through the Civil Service at the beginning was that of a Construction Clerk. The practical application of the knowledge I have of accounting has been largely made in the course of my employment by J. G. White & Company and the Los Angeles Bureau of Water Supply in the Aqueduct Board; but my experience has been closely allied with the study of accounting and with the application of methods of accounting for the last fifteen (15) years.

I am not a member of any of the accountants' societies and do not hold any accountant's degree or claim to be an accountant.

My study of the methods of accounting has been conducted principally in the course of the employment to which I have just referred. I have studied accounting from an Engineer's viewpoint all the way through and not from an accountant's viewpoint.

926 While I was employed by J. G. White & Company in investigating the affairs of other corporations, it was frequently necessary for me to make recommendations in regard to the keeping of accounts and to the organization of accountant's forces.

Part of the time I was employed entirely and exclusively on physical valuation. As the making of valuation somewhat slackened up,

after the larger properties had been reported on, the duties that I was assigned to became more in the nature of prescribing methods by which the accounting records could continue to reflect property values and to show operating expenses in such a form that both financing and rate-making would be facilitated.

I have never been in independent charge of any construction project. It is fair to say that practically all of my engineering practice has been confined to making studies of values and operating practices from the books of public utility companies submitted to my inspection and from such data as I obtained from J. G. White & Co. or other engineers.

I have worked on construction organization where I was given charge of some of the construction work, reporting to the man directly in charge. I have kept accounts of construction work and I have handled the commissary features of construction organization. Although I have not had independent charge of construction organization, I have in a very large measure derived my knowledge of values and my capacity to analyze values from a direct familiarity with construction work. This is not true with respect to gas
927 plants themselves, but it is true of street main construction and the distribution system.

The last time that I was actually engaged on the construction of any gas works was when I was in the employ of the Southern California Edison Company in connection with the valuation of that company made by the Arnold Company in 1910 and 1911 and in some special employment that I undertook for the Edison Company following that. I made some analytical study of construction work for the Edison Company in connection with gas and electric properties during the last few months of 1910 and the first four months of 1911 based on construction work then in progress. Since the J. G. White Company closed its offices here I have done some work that you might call follow-up work for some of their clients that I had formerly worked for while I was employed by the White Company.

At least half of my engineering work has been devoted to physical values during the last seven years. By far the major part of my studies were made primarily for purposes of negotiation and financing and their use before the railroad commission was merely incidental. To cite a specific instance, my work on the valuation of the Pacific Gas & Electric Company's properties started in May, 1911, and ran through to June or July, 1912, and was exclusively used as a basis of financing. The primary purpose of those valuations was not for presentation in this or any other rate case.

I originally made a study of going concern value of the Pacific Gas & Electric Company at the request of Mr. Vincent, who
928 was, I believe, the head of the department that employed me.

The work was commenced about April 1, 1916 and I do not think the purpose of the study was definitely stated. So far as I know the Pacific Gas & Electric Company does not carry on any of its books any item on the Asset side for going concern value under that heading, nor did I find any item carried under that name in

the books of the San Francisco Gas & Electric Company or the Metropolitan Company. The only personal familiarity with the Metropolitan operations as an independent company that I had was derived from making a valuation of the property in 1911 and an analysis of its books and operating records in 1916. I had nothing to do with determining the price at which it was transferred to the San Francisco Gas & Electric Company. When I went to value the plant I think it had just been turned over to the Pacific Gas & Electric Company and was then operating under the management of the latter.

I do not think that the applicability of the original cost of development method or any other cost method of appraising the going concern element depends upon whether you consider the cost of developing a business as an expense of operation or as a part of the investment and a capital asset in the business itself. Whatever classification of accounts is used, the cost of developing the business would be just the same. The elements of cost of development are determined from so many different accounts that I don't recall having seen any system of accounting that groups them together under one head. Every kind of cost that you can possibly spend money for goes into the cost of developing a business. The accounts of a corporation may in general be divided into two classes.

929 First, that which has to do with the capital assets of the corporation, and second, that which has to do with its operation and reserve accounts.

If the company is starting out and builds a plant, naturally that charge goes immediately to capital. If the company has no consumers for the first year or two and incurs a lot of operating expenses, which it cannot deduct from gross revenue because there is none, or because it is insufficient, nevertheless those charges should appear in their operation account.

Assume that you consider this deficit incurred in building up a business as an operating charge. Whether there is any more reason for capitalizing that than there would be for capitalizing fuel, oil or labor costs incurred in constructing the plant or its business would depend a great deal on the purpose that you have in making the assumption. If you make an effort to ascertain what the cost of developing the business has been, it is necessary for you to go into the original books of account and interpret the entries there in the light of the circumstances that attended them and in accordance with your purpose in making the study.

It is not at all necessary for you to be bound by the conclusions of the bookkeeper who made the entries as to what interpretation actually should be placed on the expenditures of the money that were made. Obviously the cost of fuel oil used in making gas is an operating expense. If, in the early stages of the operation of a plant, when you are tuning up, you make a lot of gas to bring the plant into efficient operation, and are operating it at a loss or at a waste of fuel, clearly you are benefiting that unit by the operation and I would not hesitate to make a considerable charge during that operation to capital account, because

the plant has actually been benefited. However the consumers have not benefited by it in the sense that they have received the output of the plant in efficient condition.

I think the cost of experimenting during construction is actually a part of the cost of constructing the plant. You cannot take the expenditure itself away from its setting, away from the circumstances that created the necessity for it, and determine arbitrarily that because you have a given material that has been used for the plant, that the expenditure for that material is either a construction charge or an operating charge. It is necessary to analyze the conditions that attended the expenditure of the money and determine from that the result of your study. There are numerous instances both in utilities and in non-utilities where this sort of deficit—the loss of money in the earlier operations,—has been capitalized and securities issued to obtain the money to pay it in.

The Marin Municipal Water District on the North Side of the Bay has paid its bond interest for the first two years out of the proceeds of the sale of the bonds. It is extremely doubtful that during the next few years they will make an abnormal profit out of operations and return to the bond issue proceeds the amount that they have thus taken to pay interest. I am inclined to predict that they will repeat their previous performances; that they will either levy a special tax, which would be comparative to an assessment on stockholders and an increase in the investment, or get out a new bond issue to pay their excess current charges.

931 In the case of the San Francisco Companies; the original San Francisco Gas Company paid its first year's operating expenses out of the proceeds of the sale of stock which was in a measure a capitalization of its operating expenses. There is evidence that some of the other companies used proceeds from the sale of their securities to pay excess operating expenses during the earlier period. An examination of the minute book of the corporation shows that the dividends paid to the stockholders of the San Francisco Gas Company in the earlier years of the operation of the plant, that is, prior to 1861 never exceeded the savings bank rate of interest in San Francisco on the money that they actually put into the corporation. To put it another way, during three years of the operation of the company it was borrowing money from local bankers at the rate of 3% per month on the actual amount borrowed, and their dividends so far as I can recall never exceeded 15% per annum on the actual amount of money contributed by these stockholders during that same period.

With reference to the consideration of the cost of building up the business as an operating "deficit," in my opinion it is not strictly speaking a deficit. It is an actual expenditure in the acquisition of business, and for that reason is strictly a capital charge and should be made a part of the company's permanent capitalization. I would not capitalize the proportion of the expenditure that the revenues are reasonably able to carry. To put it another way, the consumers of the utility at that stage of the development are not properly

chargeable with the cost of developing a business or carrying
 932 on the expense of operating a plant that is entirely beyond
 their necessities. For that reason I would think that a legitimate charge to operating expense should not exceed the amount that is proper and reasonably chargeable to the consumers at that stage.

In accounting practice you sometimes find that utilities have charged the cost of developing business as operation expense, but it is generally re-adjusted later and the books ultimately show a proper interpretation of it, that is, they sometimes do and in many cases they do not. You are not always warranted in taking the conclusions of the accountant at the time of entry as to the effect of expenditures, when the effect really cannot be determined until later on in the life of the property.

It would not be the logical practice for a corporation which incurred an actual deficit during the first one, two, or three years of its existence, to carry that deficit on its books as an operating deficit and later charge it off against surplus after it had taken care of its bond interest and dividends, because in my judgment the expenditures included in the deficit would have actually resulted in an increase in the value of the corporation's properties and in an advantage to the community as well. In view of the existence of the added value, it seems to me just and proper for those who own that
 933 value to have some certificates or securities as evidence of
 title or ownership to it.

As you define the deficit in the first place, it is an expenditure that has resulted in the creation of value, and that value exists and belongs to the enterprise itself, and for that reason I feel it should be capitalized. The principle should not be carried to a grotesque extent, and you are not justified in assuming that all operating expenses are subject to capitalization. The line drawn at the point where the deficit commences is not an arbitrary line, but is a line that is drawn automatically by the surrounding conditions. We are speaking now of the cost of developing the business, not of the value of the business. The cost is measured by the expenditure that is made in the operation. That expenditure is determined by an item that you call a deficit. Now we are speaking of that deficit only, and the circumstances that created it. I would regard such a deficit, as I stated, as an expenditure for the creation of business, and as such, a minimum measure of value, provided that the business worked its way out to stability.

Now the fact that we consider that expenditure an element that creates value does not warrant us in assuming that all expenditures create value. I do not believe that it is the usual practice of corporations to write-off these expenditures out of their surplus for the succeeding years. I have known quite a number of them to defray the expenditures involved out of the proceeds of the sale of capital issues. The principle would not apply to the San Francisco Gas & Electric Company because it never was a developing concern. It succeeded to the properties and business of two, and later,
 934 three other utilities that had gone through the development stage.

The history of the constituent and antecedent companies of the Pacific Gas & Electric Company, is that without exception they were attended by heavy losses during the earlier stages of development. The evidence indicates that in some cases there were mergers followed by more profitable operation.

Referring to the first page of Exhibit 32: the most profitable period of the San Francisco Gas Light Company included the years that followed the merger of 1873. That period concluded with the year 1880, about the time of the organization of some competing gas companies which finally merged into the Pacific Gas Improvement Company. The period of competition that followed resulted in very low dividends for a number of years. By the early nineties they had gotten back to what might be called a normal state again. I don't think they earned a good profit based on the investment during the period preceding 1897. The books are not available and we cannot examine them. During all that period the company maintained no depreciation annuity at all. Profits derived from the business in excess of interest and dividend requirements were used for construction and extension of service and for replacements. The net amount so used was charged into capital account.

I've heard a good many rumors that many fortunes were made in the gas business in this city, but I can find no evidence to confirm them and I have no reason to believe them.

The circumstances attending the establishment of some of the earlier competing plants indicate that they were the result of the invention of new gas processes some of which had merit, but most of which had none. You will find nearly all of the earlier competing gas enterprises centered around the invention of a new process of making gas. The cost of gas was such as to stimulate the inventive genius of the mechanical fraternity and they were trying to work out some better methods. There were not always sharp rate cuts after competition started.

I believe the merger of 1873 was effected by a combination of all the discordant elements, which was also true of the merger of 1896. The merger of 1903 was effected by a consolidation of two of them and the elimination of the other interests. That of 1905 was an outright purchase by entire new interests. The Pacific Gas & Electric Company came in and bought up the whole city with the exception of the Metropolitan. A monopoly was established in 1911 in the gas business.

Passing to the comparative plant method study. It involves the time factors set forth on Page 30; and the preliminary assumption as to the percentage of meters as taken on each year is shown on Page 31. These assumptions are primarily based on the Metropolitan experience, but take into consideration the fact that the Metropolitan occupied only a congested territory, only a portion of the area that the comparative plant is designed to cover, and which, for that reason, had a much shorter period of the installation of the property than they would have had both relatively and actually if they had undertaken to occupy the entire city. These assumptions are based on all the facts that we have been able to gather relating to

the developmnt of such properties both in San Francisco and elsewhere.

936 In the case of the Metropolitan plant, Exhibit 46, Page 69, shows that in 1906 the company had quite a big investment in structures and land. More than half of the entire investment had been made before May 1st, 1906. It was made in contemplation of the company going into the coke business rather than the gas business. When they failed to renew their contract for the sale of gas to the San Francisco Gas & Electric Company for re-distribution, they immediately engaged in the distribution and sale of gas themselves, laying a short pipe line.

The territory they served was destroyed by the fire. I judge from the expenditures on new business, and from other evidence of that kind, that the Metropolitan went after business with a fair degree of aggressiveness. I am not sure whether they cut rates or not. I do not think the maximum rate was charged during any of the years subsequent to 1906. I believe there were some rate cuts between 1906 and 1909. In 1909 an agreement was reached with the other companies in regard to the maintenance of rates, and rate cutting stopped. I have not seen the agreement and I don't know that it divided territory between the companies. I don't recall the exact limits of the territory served by the Metropolitan, but believe it occupied the territory north of Market St. and East of Divisadero. In general they served the northern part of the city. I am not familiar with the distribution of that business—what proportion was industrial and what proportion was residential. They had a higher rate of income per consumer than the Pacific Gas & Electric Company had. The number of their consumers was less than 12% of those of the competing companies.

937 I believe the Metropolitan made considerable headway in competing with the Pacific Gas & Electric Company in its residential business. In 1905 they outlined a general plan for distribution system and placed an order for sufficient pipe to lay the street mains and to build the necessary services. It was that program that was carried through and never extended. If you will look at the table, Page 69 of Exhibit 46, you will see that the street main construction had reached \$444,000. at the end of 1907. At the end of 1911 it was only \$468,000. showing an increase of only \$24,000. in main construction in the last four years of the plant's operation. It gained very few consumers during the last four years, in fact, losing consumers during the last two years of its operation. That fact makes it necessary for us to make some assumptions from this and depart from the exact experience of the Metropolitan in building a comparative plant for the whole city, because they virtually completed their distribution system (excepting in so far as the services and meters were concerned) at the end of the third year.

After that the increase in business was due to the fact that some of its consumers took more gas than they had formerly. The number of consumers increased until the end of 1909. In 1910 and 1911 the number was virtually stationary. The maximum capacity was reached in the early part of 1910.

The Metropolitan Company commenced to develop its business in 1905. The following year the business was wiped out, but the plant they had built during that year was not. In four years they reached their maximum state of development having started 938 in on the first of May 1906 and running to the early part of 1910. However, they were in the occupancy of a restricted area.

My assumption has been for a period of six years for the city as a whole. A company operating as the Pacific Gas & Electric Company is operating in the city as a whole would require a longer time to develop the gas business on account of the larger area. As the area for which your system is designed to serve increases naturally the development takes a longer time.

The Independent Gas & Power Company which is quoted in this record, operated for about a year. It built a system that cost some thirty or forty per cent more than the Metropolitan and yet its gross earnings for the year were less than one-third of the Metropolitan's at its maximum. Therefore you cannot say that the Independent Gas & Power Company had developed a paying business. The Metropolitan connected consumers as fast as it laid mains. The Independent built a much larger and much wider ramifying system of street mains than the Metropolitan and yet at that time it had one-third less consumers than the Metropolitan had at its maximum development. I don't think you can assume from that, that the Independent's business was developed as the mains were laid. They would have been confronted by several years of stiff hard work to acquire a satisfactory degree of business.

It was not so much the growth of the Independent's business, as the destruction of business stability that competition had produced and the direct menace of a still further cut into their earnings, that induced the San Francisco Gas & Electric Company to buy 939 out the Independent. The San Francisco Gas & Electric Company and its predecessors (the San Francisco Gas Light Company and a still earlier company) were always the principal companies serving San Francisco with gas and the business which existed in 1911 had been built up over a long period.

The purpose of my study was to make an appraisal of going concern value as nearly under conditions applying to the valuation of the physical properties as possible. Starting with the assumption that the physical property had been installed within a few years time, it seemed natural to use, as a basis for valuing going concern, the assumption that the business had been developed in the same time or under the same conditions assumed for the valuation of the physical property. I have assumed that at the commencement of the development period there was an existing company serving the people, and that a new company would come in and take its business away by competition in rates and service. I also assumed that some of the business would have been established by preceding companies and that the new company would introduce an improved process of manufacture, produce a better quality of gas, and thus bring

about lower rates. I have assumed that the bulk of the people in San Francisco were inadequately and incompletely served with gas. I also assumed that the new company would take business away from the old companies with a fair degree of rapidity, and probably in the fourth year of the age of the plant, or the second year of operation, would acquire through purchase, the property and business remaining to the previous companies.

940 Subsequent business would be due more to extension of the street main system in the territory not then served, and to the development of business, than to the normal growth of the city. This latter assumption is not in harmony with the facts as they existed but is in harmony with the assumption made for the valuation of the physical plant. For that reason it ought to be taken—that is we are taking the plant on the basis of its physical value under conditions existing from 1907 to 1914. If we go back beyond that period for the development of business, it is necessary for use to do the same in the construction of the physical plant. Ultimately it would take us back into construction costs, vastly in excess of anything encountered in recent times. Such a principle would undoubtedly reduce the cost of developing the business, but it would vastly increase the cost of installation of the physical property.

My statement that the original cost would have been in excess of the cost today is based upon the records of the purchase of gas pipe back in the earlier years showing prices as high as \$90. and \$100. a ton. Labor was paid something less than it is now, but the installation of a street main system is about 75 or 80% material and 20 or 25% labor. Back in those days it would probably run as high as 90% material on account of the much higher cost of material. The assumption as stated is the result of attempting to harmonize the appraisal of the intangible elements of property with that of the physical elements.

The dates of meter installations given are modified by
941 taking into consideration the fact that the Metropolitan system occupied a so-much smaller area that their development was accomplished in a larger range of time. If you will turn to the graphic charts on Pages 73 and 74 of Exhibit 46 I think the point will be made clearer.

The comparative plant curves are almost identical with the Metropolitan curves excepting the earnings curves. Conditions are very similar up to a certain point where the Metropolitan curves of operating expenses and earnings all flatten off. I have assumed a higher rate of earnings for the comparative plant during the earlier period than shown by the earnings curves of the Metropolitan. I have assumed a more rapid acquisition of business than the Metropolitan records really warrant. They were undoubtedly hampered to some extent by the Fire in 1906 and difficulties attending their development during the next year. It is necessary to assume a more protracted growth for the comparative plant due to the fact that it is designed to serve a whole city, while the Metropolitan was **only** designed to do business in a small section of the city.

You will notice the earnings curve of the Metropolitan plant starts low and comes back very slowly for the first six months. The earnings curve of the comparative plant starts earlier and ascends in a sharper ratio. If I had used the Metropolitan data exactly during that period I would have a much higher deficit in the comparative plant in the earlier months of its development.

It might well take twenty years to take the business away from a very healthy competing company and it might never be taken
942 away from them. If you consider reverse conditions, a weak company coming in and competing with a strong company, the result would be the reverse of that I have obtained here.

I have assumed a development under conditions the reverse of the Metropolitan conditions. That is, I have assumed that a strong company comes in and absorbs the weaker, developing the territory, instead of a weak company coming in and making a bluff at competition and then selling out. If the territory was not being served at all, you would have to assume a time to actually educate the people to the use of gas. I think it is fair to say that there is no standard period in which competition can be counted upon being wiped out. It all depends upon the circumstances of the individual case.

The assumption of 8% for money cost in accruing deficit under the comparative plant method is based entirely upon the experience of the Metropolitan Company.

An examination of the Metropolitan books does not show that they started out in the first year of developing their business to amortize their bond discount and carry a sinking fund for that purpose. I believe the general practice of companies, is to wait four or five years before starting to build up a fund for the amortization of bond discount. If you were starting a new business and had to carry the accruing deficit for a few years, I do not believe it would be good practice to wait until the development period passed before burdening your earnings with the necessity of carrying such
943 a fund, because, I think if you did, you would find yourself up against a rate making body that would penalize you for not having made provision for amortization during the life of your bonds.

The Metropolitan did not carry such a sinking fund. It had to retire some 367 of its bonds out of the proceeds of the sale of the property in December, 1911. The people who took over the property paid for it in cash and the vendor used the money to take care of the retirement of those bonds.

In the comparative net earnings method which I have discussed, the results depend upon the assumptions with respect to time and rate of growth which I made with reference to the comparative plant. Any criticism of the comparative plant method by reason of these assumptions would also be applicable to the net earning method. With reference to the rate of growth, my estimate of the number of meters set monthly, as shown at the top of page 39 of Exhibit 46, contemplates a maximum annual increase of 22,700 meters. My estimate assumes that during the first full year of

operation 9,000 meters would be installed. The Metropolitan plant in its greatest year's growth did not reach such a number of meters. It can be safely assumed that they added to their system all the new consumers they were able to serve. I feel that my estimate of the rapidity of growth of the comparative plant is very high.

The Metropolitan Company acquired 1,200 consumers during 1906, 2,744 in 1907, approximately 2,500 in 1908, and 2,000 in 1909. Therefore its greatest year's growth was about 2,500 meters.

I have tried to take the Metropolitan experience and apply it to a system occupying the entire city. While growth in this case would be far more rapid than that of the Metropolitan, I am unable to find any reason for increasing the proportionate annual growth. While the relative rate of growth between the Metropolitan Company and the Pacific Gas & Electric Company would be perhaps similar, you would have to spread it over a longer period of time. As a matter of history, the present gas business of the plaintiff has been developed in sixty years. In estimating the time in which any comparative plant would build up its business, we are compelled to rely on analogy which appears logical and reasonable under the conditions assumed.

An attempt to estimate a reproduction, in a few years, of the business of a company would be no more arbitrary in its nature than an estimation of the time required to construct a physical system, because no company would install a system of distribution mains without taking into consideration the economic needs of the community served.

Whether we are estimating the cost of reproducing a gas plant or are estimating the cost of developing a gas business, I think we are under the absolute necessity of assuming that street mains would not be laid unless there were consumers to be served by them or prospective consumers that would utilize the service within a reasonable time after it was provided for them.

I have endeavored to make my appraisal of going concern harmonize with the conditions assumed for the reproduction of the physical plant in the engineer's appraisal.

Assuming that the plant, as a matter of fact, could be reproduced in three or four years, I do not think the business could be developed in that length of time. The period of time assumed to be necessary for the construction of the property is based in part on an estimate of the length of time required to develop the business. I think that the time required for the construction of the property would not be less than the period of time estimated for the development of the business. I assume that the development of the business and the construction of the property would proceed concurrently. Both assumptions are more or less arbitrary because we have no exact data on which to base them. The comparative net earnings method as applied to a hypothetical plant is not based on making any change in the Pacific Gas & Electric business during that period; on the contrary, it assumes that this comparative plant might have been in operation in an-

other entirely similar location; its net earnings being compared year by year with those of the Pacific Gas & Electric Company for the past six or seven years.

The following example may serve as an explanation of the comparative net earnings method. An investor having an opportunity of purchasing either the Pacific Gas & Electric Company's gas enterprise in San Francisco or another similar enterprise occupying similar territory, with a similar plant and system, but without established business or income, and being advised that the development by the latter of an equivalent business would occupy a period corresponding to the last seven years of the Pacific Gas & Electric Company's operation, would endeavor to ascertain the comparative desirability of each investment. The investor, under such conditions, might well resort to an estimate of the net earnings of each enterprise as the test to determine the comparative advantage

946 of one investment over the other. As to the conditions in this comparative territory, we would assume that the Pacific Gas & Electric Company had operated without change during the period from 1908 to 1915 and that the owner of the comparative plant had gone into a similar territory in 1908 that was then occupied by two smaller and inadequate concerns and had acquired its business first by competition and later by purchase, and had energetically prosecuted a program of development until at the expiration of 1915 it would have exactly equivalent property and exactly the same number of consumers served in exactly equivalent territory.

We must necessarily assume in this case that the old companies having the going business at the beginning of the period would lose their business to the new company. It is not easy to analyze such a condition as would follow because the old companies undoubtedly would put up a fight for their business if they occupied the entire territory. The assumption would be complicated by so many conditions involving personal qualities, business policy, resourcefulness and scientific skill, that I have tried to avoid using it in this set-up. There would undoubtedly be any number of legitimate objections to make to any hypothesis that you would use in the study of the cost of reproducing business under any other conditions than those which actually obtain. For instance, if a city were inadequately supplied with gas as suggested, the city itself might have gone into the gas business. However, I do not feel that the objections to the assumptions impair the reasonableness of their use, as assumptions are absolutely necessary for any valuation or appraisal.

947 It is my experience, that the Rule-of-Thumb methods mentioned in this study are generally used in the first instance, not as a basis of determining values, but of measuring the reasonableness of estimates of value after they have been partly determined by other methods.

No valuation of going concern on the basis of gross earnings should be made without taking into consideration also the net earnings and many other economic conditions affecting the property and its use. I would apply the Rule-of-Thumb methods to any property only after a careful examination of the property itself to determine

whether or not such methods were applicable in any form to that property. Only by a careful study of the business itself can it be determined which particular method should be applied to it. I have endeavored to apply to the business of the Pacific Gas & Electric Company these methods of approximation in the light of a study of the property itself. The same difficulty confronts you in the application of any method of estimating value. I have tried to analyze in the statement which I have read (Exhibit No. 46) the conditions covered.

In the case of the Spring Valley Water Company, you would have to use a different percentage of physical value in estimating the value of its going concern because the conditions are altogether different. Spring Valley Water Company's property is very largely in lands and structures that have a low earning capacity and a condition of permanent stability. The value of going concern in that case would necessarily be lower than it would be in the case of a property which consists largely of structures with a higher earning capacity. The statement on page 16 of Exhibit No. 46 that the

948 Rule-of-Thumb method which is based on physical valuation varies from 15% to 25%, applies to the gas properties. The consumer basis would depend upon the character of the consumers and the nature of the service supplied them. That is illustrated by the natural gas property that I referred to previously. The gross earnings amounted to about \$300,000 a year, the physical property to about \$500,000 and the number of consumers was only 67.

In applying the method on the per-consumer basis the character of the business has to be very fully considered and the number of consumers as well. The method is based on general experience and general observation of gas properties; for example, the development cost of the Metropolitan Company indicated a cost per consumer of \$28.82 which I felt was low and due to the favorable conditions that surrounded the development of the Metropolitan Company's business. This figure is arrived at by dividing the deficit by the number of consumers and that gives the cost of acquiring business at that time for that company. The Metropolitan Company had a new business account, which account, in connection with all the other expenses gave the figure of \$28.82. The Pacific Gas & Electric Company maintains a similar account to which is charged the cost of acquiring the business of new consumers. The costs in this account are carried as operating expenses.

Turning now to the market value of securities method. By this method you measure going concern value as the difference between the market value of the company's securities and the physical appraisal. In effect, you take the market value of the securities 949 as the basis of the valuation. You would not need a physical appraisal at all by taking the market value of the securities over a given period and saying that they represent the value of the plant and its business based on the estimates and the experience of the investing public. In the application of that method the only function of a physical appraisal would be to inform the investing public.

The following explains the basis on which I have prepared my statement (Exhibit No. 48) showing the par value of outstanding securities of the Pacific Gas & Electric Company on December 31, 1913, 1914, 1915 and 1916, the market value on the same dates, and the value assigned to the San Francisco gas department property including all of the intangible element, that is going concern and established business:

On page 71 of Exhibit 46 there is a tabulation of the securities outstanding January 1, 1916, and the market value of the same as shown by the sales on the San Francisco stock and bond exchange. I have prepared similar tables for the other three years and the results are shown on pages 2, 3, 4 and 5 of Exhibit 48. The total securities outstanding on January, 1916, had a par value of \$132,795,058; the market value as shown by the sales at that time was \$114,519,081. During the year ending December 31, 1915, the net earnings of the plaintiff's San Francisco gas department amounted to 17.95% of the net earnings of its entire system. 17.95% of \$114,519,091 is the sum of \$20,556,175 which is the market value of securities applicable to the San Francisco gas department on the basis of the ratio of net earnings of the San Francisco gas district
950 to the net earnings of the entire system.

I have followed the same method for each of the other years. The going concern value on that theory advances from about \$1,300,000 on December 31, 1913 to practically \$8,000,000 on December 31, 1916. I think the results go more to illustrate the unsoundness of any method of valuing property, based on a permanent fixed value, than to indicate the weakness of this particular method. We have on December 31, 1913 a general condition of adversity with regard to the company's business and its financing. There were a number of influences that tended to depress both the value of its securities and the standing of the company in the eyes of the investing public. It had just passed through a very extensive and difficult strike; gas rates in San Francisco for nine months of the year had been fixed at seventy-five cents and consequently the net earnings were low. The Company's system as a whole had just completed the installation of some very expensive hydro-electric plants which were not yet on an earning basis. Everything tended to give a very low market value for securities that year.

At the end of 1916 we had a period of extreme buoyancy in the securities market, a temporary fluctuation as was the condition in 1913.

I found that the actual market value of property fluctuates in accordance with any change in the security market with even wider ranges of fluctuation.

The price at which gas plants would sell on the market is something we cannot tell as they are not for sale. The only way
951 we can determine their market value is through the sale of securities that are issued in financing their construction. The plant has no market value we can determine by any of the ordinary standards of commercial transactions. In so far as this phase of the presentation is concerned, the only market value I am consid-

ering and the only one I have had any opportunity to measure is the market value to be determined by the fluctuations in the prices of these securities.

At no time was a majority interest in the company for sale but the total transactions over the period of time covered by this study exceed the entire volume of issues outstanding. However, they don't represent any right to control the operation of the company and it might very well be stated in this connection that if a set of interests should desire to acquire control of the Pacific Gas & Electric Company through a purchase of its stock there is no question in the world but that the injection into the market of a demand for stock in excess of the quantity normally sold would immediately tend to inflate the price of the stock; in other words you could not, under normal market conditions, buy control of the Pacific Gas & Electric Company at the price at which its securities are on sale at the present time.

You find a few cases where the owners of a controlling interest in a property flood the market with securities and an opposite effect is shown in the price of the stock. There are two matters of fact that might be mentioned in that connection. The purchase of the stock of the San Francisco Gas & Electric Company by the Pacific Gas & Electric Company in 1905 is a very striking instance. The

952 stock had been held very close to par from 1897 on to the beginning of 1900. There was an abrupt decline at the time of the Spanish War in 1898 which was almost entirely recovered; then competitive conditions and the impairment of earnings due to those conditions depressed the stock to a very low point; earnings were reduced, dividends were reduced and finally discontinued, and the stock sold for perhaps all of 1902 and 1903 and a good part of 1901 at below \$50 a share. However, when the Pacific Gas & Electric interests undertook to purchase that stock in 1905, there was a steady and quite rapid increase in the price, and they ultimately had to pay \$90 a share for it. This price was very nearly double the market price that had prevailed during the year previous to the actual purchase. Under those conditions they acquired the controlling interest in the San Francisco Gas & Electric Co.

Immediately after the acquisition by the San Francisco Gas & Electric Company of its competitors in the fall of 1903, the price of its stock went up. It resumed dividends; however, the stock went up no higher than \$65.00 or \$66.00 per share. The price fluctuated between \$55.00 and \$65.00 throughout the year 1904. Early in the year 1905 it started steadily upward under the influence of the demand for the stock by the Pacific Gas & Electric Company. The knowledge of the fact that negotiations were in progress and the sensitive feeling of the owners who realized there was a new and steady demand for their stock, had something to do with this advance. The conditions prevailing in 1913 were temporary
953 and abnormal. The securities market had been much higher a year previously when Pacific Gas & Electric common stock was paying dividends. Although I have not the exact figures here, the result is about 20% higher than the figures shown on this table for 1913. Now appreciating the fact that many fluctuations in se-

curities are temporary in their nature and the result of abnormal conditions that are in themselves temporary, the effect of them on the determination of value based on net earnings is to give a range of extremes between which the normal or true value may be expected to lie. Applying this method to the property we find a range of extremes that is not far off from those shown on Page 28 of Exhibit 46, that is, a low extreme of somewhere in the neighborhood of \$2,000,000 and a high extreme perhaps in excess of \$5,000,000.00. It would not go as high as \$8,000,000.00. I believe the figures of physical value, including other assets, would be somewhere close to \$16,000,000 at that time, including working capital. Somewhere between those extremes we would find the true value.

The market value of securities method is merely one of the methods of apportionment,—one of the methods of determination, and I think it is the one that is subject to the greatest periodical fluctuations. Somewhere between the extremes is a point we can reach that represents what we might consider the minimum stable condition.

At the end of the first or second quarter of 1913, the Pacific Gas & Electric Company after having commenced the payment of dividends on its common stock discontinued them. In 1915 there was a heavy increase over 1914 in the electric earnings and the general
954 system earnings outside of San Francisco. The percentage that the San Francisco gas earnings bore to the Pacific Gas & Electric total was higher that year than it had been in any one of the other three. At the end of the exposition year, or December 31, 1915, there was an increase in the market value of plaintiff's outstanding securities as shown of about \$11,000,000.00 and a decrease in the relative percentages that the San Francisco gas earnings bore to the total of nearly $1\frac{3}{4}\%$.

In 1916, which barely exceeded 1915 in the gas earnings in San Francisco, we had an increase over 1915 of \$2,600,000.00 applicable to the gas department. It is explained on the basis of this method of determination that is subject to all the influences which affect the market of securities and the judgment of investors with regard to the desirability of purchase or sale.

I am not familiar with the attitude of commissions or courts on this method of determination. The largest single factor in determining the market value of securities, as ordinarily sold, is the earning capacity of the property they are based on. Earnings themselves may not always be a true index. Very often purchasers go beyond the earnings and consider the earning capacity; but you might couple the two together. Both of them depend upon the rates. I think that this method of estimating going concern value would be applicable to any plant, subject to the conditions that surround it. Of course, if you have a plant that is financed in a manner that makes a free and open market for its securities difficult or impossible; or if the securities are closely held and there are no typical or
955 representative market sales; or if the market has been subjected to outside or inside influences that would inflate or deflate the ruling prices, such circumstances would have to be

taken into consideration, and might impair or totally destroy the value of that method of determination.

Considering the case of the Spring Valley Water Company where during the years from 1907 to 1915 the total of the selling prices of the securities of that company varied from \$21,000,000.00 to \$37,000,000.00, (that is, multiplying all of their securities by the selling prices at given periods for each class of them) the lowest appraisal given by the company for its plant was \$40,000,000.00; so that if this theory were applied, the maximum going-concern value would be minus \$3,000,000.00. We would not only have to take into consideration the fact that during these years the Spring Valley rates and its properties were somewhat in controversy, but also that this very element of going concern value which we are trying to determine on the market sales basis, was attacked and disputed by the regulatory bodies. The investing public under conditions of that kind, in buying a security based on such a property would be guided by the possibility of not being able to get the full physical value of the property behind the securities, and the very serious possibility that political conditions would continue so adverse to the company that there would be no possibility of its being allowed a going concern value.

The activities of the Pacific Gas & Electric Company were so much more widely scattered, and its resources were diffused in so many other lines that the effects of litigation, while undoubtedly indicated in the market sale of securities, were not as prominent as in 956 the case of the Spring Valley Water Company where all of its property is located in one place and is employed in one line of activity.

All of the outside interests of the Pacific Gas & Electric Company have a large influence on its security values. To ascertain the values applicable to the San Francisco Gas Department alone, based on the selling price of securities, the segregation of those values should most properly be made on the basis of physical values. The method of segregation on the basis of net earnings has merit, and should be considered, but I regard the segregation on the basis of physical values the best method.

The fact that the market value of a company's securities may be less than the appraised value of its physical properties does not, in my opinion, necessarily impair the use of the market-value-of-securities method. The security values of a company owning property which is operated unprofitably undoubtedly would not equal the reproduction value of that property. Yet, as a measure of value from an investment standpoint, the security sales might be a very true guide.

Where you have a plant with a going business, and the market value of the securities is less than the appraised value of the plant, I would say, in such a case,—without investigating it or examining it—that either the business has not yet been developed and consequently does not exist, or the value of that business has been subjected to such effective attacks, from any one of a combination of sources, as to impair its value from an investment standpoint. If

the property is operating at a profit and is subjected to potential competition, as the Spring Valley Water Company, or actual competition like the United Railways, I would say that the value of the business has not been impaired by the surrounding conditions, but that the ownership of that business is seriously imperiled and for that reason the investor would assume that he was not acquiring a definite or permanent interest in that business.

If in any particular case the value of the physical properties, (not merely the appraisal of them), is greater than the market value of the securities, you cannot use market values to find going concern.

I might speak of a condition that existed in the town of Oxnard, California. There was a water system that had been condemned by the municipality. The Railroad Commission had fixed a certain value on it, but the municipality did not care to pay that price. It thought that the value was placed too high, and proceeded to install a competing system, which, largely due to local conditions, was an immediate success. The competing system attracted so many consumers from the older company in the very beginning, that the owners of the company agreed to sell the property for a figure only,—I believe—one-third of the award made by the Railroad Commission. There, was an impairment, not only of going concern value, so far as it inured to the company that operated the original property, but of structural value as well. Wherever such a condition existed, or wherever there was a possibility that it might exist, I believe the fact would be reflected promptly in fluctuations in the market value of the company's securities.

When you speak of market value, and intrinsic value, you are really using the term value in two distinct senses. Market value is measured by transactions in the market, that is, by purchases and sales. When you speak of intrinsic value, you are using "value" in an entirely distinct sense,—not value measured by purchase and sale, but value measured by some conception of utility and usefulness. The usefulness or utility of specified property may remain constant through a considerable period of time, in which its market value may fluctuate widely. Utility is not the same thing as value in the ordinary economic sense, that is, value determined by purchase and sale. The market value of physical property as well as of intangibles is subject to constant fluctuation and change as a result of varying financial, economic, social and political conditions, even though the utility of the property may remain the same. Reproduction value is not the equivalent of market value. Yet in estimating reproduction value, you employ the market value of materials and the current wages paid for labor.

The utility of the property of the water company in Oxnard had not been impaired by the potential or actual competition to which it had been subjected nor had its reproduction value been affected by those conditions. But the market value of the physical property and the market value of the business which that company possessed, and which was threatened by competition, had become so impaired that they were willing to accept a figure for their

property much lower than the railroad commission had established as its value.

I am not attempting to lay down any general principles for determining values in all cases. I am taking the principles that I have seen applied elsewhere, or heard of being applied elsewhere, and am undertaking to apply them to the particular property in question, after studying the property and its business. I doubt very much whether you can take any general principles of value, and apply them indiscriminately to properties anywhere, under any conditions, without making a careful analysis of those conditions.

I believe that the purchase and sale of securities of the Pacific Gas & Electric Company should be given considerable weight as evidence of value attaching to the properties that the securities cover. There is no question in my mind, but that the large volume in which those securities have been absorbed in the local market, the constant feature of the trading, their ready saleability, the freedom of the market from special or extraneous influences, the earning capacity of the property itself, and the sustained character of the interest and dividend payments on these securities alike, entitle these circumstances to be regarded as evidence of value.

While the hydro-electric program of the Pacific Gas & Electric Company had some influence on the market prices of its securities, it was not extraneous to the company or its activities as a whole, and in our method of valuation we are considering the company as a whole.

960 The fact that the Pacific Gas & Electric Company has met and sustained almost constant competition in its electric department would tend to inspire investors with the belief that it could continue to meet competition on even terms and survive.

The variation, during the years in controversy, in the total market value of the securities apportioned to plaintiff's San Francisco gas department, in Exhibit No. 48, is from \$15,948,000.00 in 1913, to \$23,191,000. in 1916. The total increase in capital represented by investments in physical property and the total increase in business in plaintiff's San Francisco gas department from 1913 to 1916 are not proportional to the increase in value of such securities. There were abnormal influences at work in both the extreme periods. The abnormal condition in 1913 was due primarily to a generally depressed security market at that time, and second, to the fact that the Pacific Gas & Electric Company had been prosecuting a very large program of expansion which made it necessary for them to market a great many securities,—more than the market would absorb without a deflection in the price curve. There also were a number of local influences, like the strike in San Francisco and the low gas rates in effect during the previous year. All of these causes gave an abnormally low value based on the market value of the securities.

In 1916, conditions were somewhat reversed, and we had every condition that would tend to increase the price of the Pacific Gas & Electric Company's securities. The company was marketing very few new securities and was in splendid financial shape. It had no

maturing obligations to meet as in 1913. It had no new large construction program to finance. And there was a banking system that was flooded with money awaiting investment. All of these things tended to give the market value of the securities what might be called an abnormally high ratio. It might be well to state that the net earnings of plaintiff's San Francisco gas department for the year ending June 30, 1913 were \$1,093,286.09 while the net earnings for the year ending June 30, 1916 were \$1,890,889.99. Excluding the revenue in excess of the ordinance rates it amounted to \$1,532,261.40.

I believe Professor Cory's statement, that the gross income from residential consumers would remain practically stationary as long as bills were not increased, was intended to apply within reasonable limits, and to that extent I agree with him. If you raise or lower the price of gas, (within a small radius of course) there is either a tendency toward economy, or a greater use, which keeps the average bills fairly uniform. I do not know how much you could vary rates and yet have that result.

Whether the selling price of securities would vary directly with the increase or reduction of rates would depend upon many conditions. For example, the reduction in rates of the San Joaquin Light & Power Co. by the Railroad Commission some year and a half ago resulted immediately in a big slump in the price of their securities and increased the difficulty of marketing them. The final result was that there was no serious impairment of earnings, either gross or net, and the security market entirely recovered. In that case the effect on the market was prior to any injury to the company at all, but in anticipation that there would be an injury.

If you will turn to Page 71 of Exhibit 46 you will find, itemized in detail, the face rate of interest paid on the bonds, the first preferred and the preferred stock and on each one of the individual securities. The tabulation on Page 17 is a summarization of that on Page 71. The average weighted rate of interest on the bonds runs slightly greater than 5% on par value. The total outstanding bonds amount to \$76,172,800.00 and the annual interest on these bonds is \$3,814,930.00. The common stock was paying 5% on par on January 1, 1916.

The common stock has shown the widest fluctuation of any of the securities listed there. It would be the only stock that could enjoy an increase in dividends. If the dividends on common went up, the selling price would also go up so the purchasers of stock at the higher prices would get about the same rate as the purchasers at the lower price. (The term "Interest Rate" has been used to mean dividend rate.) The prices are apparently based on condition that surround the property and the earnings that attach to it. The rates actually collected by the company at the present time provide the net revenue that ultimately determines these values. Any impairment in earnings due to a reduction in rates naturally impairs the value of the securities. A reduction in earnings also impairs the value of the property and the stability of its business. If, through the Company's operations in the future, they could pro-

vide greater net earnings based on stable conditions, there is no doubt that the price of all its securities would be strengthened. To say that an arbitrary increase in rates would accomplish that result, would be stretching the analogy too far. Sometimes an increase in rates is the most destructive thing that can happen to an enterprise, as it results in the loss of business, the loss of income, the impairment of values and in many cases a much stimulated and sharpened degree of competition.

963 In the case of an irrigation company that operated a canal system in Soledad Canyon, near Oxnard, in Ventura County, two increases of rates put it out of business. There was a convenient method of competition and so the irrigation company lost its business. Exactly the same thing might not happen to a company like the Pacific Gas & Electric Company which has a monopoly, and a large investment of capital, but an increase in rates unwarranted by economic conditions would react to its detriment. A change in rates can sometimes be effected without materially affecting the net operating earnings, the primary factor in determining the market price of securities.

Referring to Page 66 of Exhibit 46, with reference to the Metropolitan Plant, the first line "Actual Earnings," is a modification of amounts shown by the company's books, as follows: I have taken from the books of the company the record of earnings for 1909 and 1910 and have subtracted from them the amount charged in excess of ordinance rates, which excess, owing to litigation, was included in an excess rate fund which was impounded. I carried the company's share of the excess rate fund, (as determined by compromise later) into the last column, 1911 earnings shown on Page 67. That is the only change I have made in those figures. The other figures shown on Page 66, I used without change, excepting the 4th sub-title under "Operating Expenses," or "General Expense." I have reduced the amount shown on the company's books by the amount shown under the second caption of each year on Page 68. Page 68 shows the distribution of general expenses.

The total "General Expenses" set up on the Company's books 964 as operating expense, consisted of the figure shown on the

4th line of the second block of items on page 66 under "General Expense" and those items noted as "General Expense" on page 68. I have not shown them anywhere as a total item, but they appear to be expenses that were more properly segregable between operating and construction expense. I have taken from the operating expenses the amount that seemed properly chargeable to construction. On the basis of the total expenses that the company incurred in both operating and capital, I have divided the general expense proportionately between the two. I took the percentage that the general expense bore to the total of operating expense and construction expense and applied that percentage to the total operating expense for the operating expenses, and to the construction expenses for the capital charge. That plan was not followed strictly, because in the first year, 1906, I applied it all as a construction expenditure. That is approximately the basis of distribution. The

figures following the word "Depreciation" just below "Net from Operations" are an estimate of the amount of depreciation that would accrue on the property based on the experience of the Pacific Gas & Electric Company, which approximates the 4% sinking fund formula in the age tables used by the city of San Francisco in the case before the Railroad Commission. The 4% sinking fund is not a separate estimate of my own. The Metropolitan set up a figure amounting to five and a fraction per cent annually for depreciation reserve. I have used 2.95 percent here. The actual replacements were much less than that. The words "Interest Payments" (page 66 965 Exhibit 46) refer to the actual interest payments that the company paid out on its bonds and its floating debt. Under the heading "Reasonable Returns on Property Value," I have shown amounts equal to 8% on the property values shown in the table.

The face rate of interest on the bonds of the Metropolitan Company was 5%.

In the first year, 1906, there was a direct loss in operation of \$16,887.00, without providing for depreciation. In the next year, 1907, there was a profit of \$40,000.00 before payment of bond interest which amounted to \$65,000.00 or \$70,000.00. The first two years the property did not earn its bond interest. By comparing the line marked "Net from Operations" with the line marked "Interest payments" it can be determined when the "Net from Operations" exceeded the bond and floating debt interest. That happened for the first time in 1908. The Metropolitan never paid any dividend on its stock. The surplus earnings over the bond interest were used to pay its floating obligations, some of which had arisen from the deficits in operations during the early life of the plant and some from construction work that was in progress during 1908.

At the consummation of the sale of the Metropolitan to the Pacific Gas & Electric Co. the former owed \$240,000.00 966 on short term notes that had not yet been paid, and that in addition to the bonded indebtedness. The figures on page 67 of Exhibit 46 were all taken from the books of the Metropolitan. On page 69, same exhibit, (capital account) all the figures were taken directly from the company's books. The general expense item is taken from its operating expenses and transferred to capital. The real estate shown in this table was purchased for \$87,500, part of it in 1899 and part of it in 1904. In 1909 an appraisal of this real estate was made and its value estimated at \$200,000.00. Some original reports on the company's property that had been made prior to the fire in 1906 gave the figure \$87,500.00 as the amount the company originally paid for the property. The change in the value of the real estate from its cost to its appraised value was entered on the company's books and explained in the journal. Comparing my figures with the figures which Mr. Reynolds, the Auditor for the Railroad Commission, obtained from a similar study of these identical books, it appears that I have apportioned the exact overhead charges as shown by the books of the Metropolitan, while he estimated a charge, applied it and made that deduction from the operating expense. I took the working capital as the amount of money

actually on hand, determined from the book accounts, including money available for construction purposes. The working capital shown here does not include bills receivable. The supplies account is shown as a separate item.

The Metropolitan carried a very large item on its books and its balance sheet which was very largely the off-setting item to the par value of their stocks and bonds and included not only all of the intangible but also all of the tangible values as well. The item included plants, and franchises and such items. It was a blanket designation of the total assets, and amounted to something over \$5,000,000.00.

I did not attempt to determine the actual cost of money obtained by the Pacific Gas & Electric Company since its inception. I applied an 8% rate of interest to a comparative plant, assumed to be developed under conditions that might reasonably be assumed to have obtained in recent times, and not to the Pacific Gas & Electric Company. It is immaterial whether 8% represents a rate of interest which is fairly applicable to the plant of the Pacific Gas & Electric Company, or not. However, I believe that if you develop a property and business under conditions necessitating the payment of 8% for money, the securities then outstanding would virtually determine the interest payments which you would have to continue to meet.

I have in mind one item in connection with the financing of the Pacific Gas & Electric Company,—the conversion of the 6% debentures issued in 1905 to acquire stock of the San Francisco Gas & Electric Company. It was effected by giving a bonus of an equal amount (\$3,903,000.00 par value) of the Pacific Gas & Electric Common stock. The debentures drew 6% interest; the common stock at the present time is paying 5%, so the company is actually paying 11% interest on the money derived at that time.

Those debentures were afterwards refunded by the General & Refunding 5% bonds, the debentures being called in at excess of par and the General & Refunding bonds being issued at less than par. As a matter of fact, the money obtained through those debentures is now costing the company, (counting in sinking fund requirements and the amortization of bond discount on the General & Refunding 5's) at least 12%. I believe a complete study of the financing of the Pacific Gas & Electric Company and its predecessors in interest would reveal that the rate of interest paid was considerably in excess of 8%. In the case of any plant developed under conditions that have obtained in San Francisco, it is exceedingly unlikely that the interest rate, which it had incurred up to the time of its getting on a profitable basis, would be less than 8%. And if that is true—which is sustained by the Metropolitan history at any rate—the interest rate the company would continue to pay for a considerable time in the future—even though its credit had been on a far more stable basis, and it had been able to borrow money at a very low rate for current purposes,—would still approximate 8%. If the company did not amortize its bond discount for a period of four or five years or until it got on its feet,

that would not be a fair example because it would be postponing the payment of some of its debts. Following this period of four or five years, it would be paying $8\frac{1}{2}\%$ or 9% because it would have to carry these unpaid amounts of interest forward and eventually liquidate them.

I assume that the comparative plant would be on such a basis that it would not be required to borrow money at a time when its credit was at a low point, as was the case with the Metropolitan Company.

The Metropolitan Company was in very serious distress at 969 one period of its life and actually issued a circular by which it endeavored to get its bondholders to allow their interest to be deferred for a couple years and take in lieu thereof additional bonds at 65% of par and buy more bonds at 65% of par for cash. The bondholders would not accept the proposition. This does not tell all of the story of the Metropolitan's difficulties in financing under the conditions existing at the time it was being developed. The par value of Metropolitan stock was, I believe, \$100.00 and it sold at \$10.00 and \$12.50. (I did not use those figures in comparing another plant.) The Metropolitan was heavily over-capitalized. In addition to the amounts of stock mentioned by me, there was quite a large block of stock given to the inventor of the gas process which the Metropolitan used. I don't think this over-capitalization,—which would of course affect the sale and the price of the stock,—would necessarily affect the bonds. The bonds are more affected by the existence of a large floating debt, and by the failure of the property to earn money, than by the existence of a large amount of stock.

The interest paid during construction had been allowed in the physical appraisal of the Metropolitan. That would only affect the estimate of going concern value in the comparative plant or reproduction methods, so where these methods were used, I deducted from the conclusions reached, the amount of interest allowed in the physical appraisal as shown by the Jones' appraisal.

970 On redirect examination the witness testified in substance as follows:

In the application of the method of ascertaining going concern value by reference to the market value of outstanding securities, or in the application of any other method, it is necessary to assume a normal plant under normal operating conditions. The fact that conditions might be imagined, or might even exist that would render a method of appraisal inadequate, would not detract from its usefulness when conditions were normal and the plant or the property to be appraised reasonably reflected the judgment of investors, as shown by the market value of the securities. It is obvious, that, if you take the value of outstanding securities as a measure of the value of the plant of the company, considering it as a going concern with an established business, there is no direct means of determining whether or not fluctuation in the value of the securities is the result of a change in value of the going concern or established business or a change in the value of the physical property. Also it might be

stated in this connection that very often the change in the market price of the security is due to some influence that is not directly associated with the company or its activities. I have in mind that, following the announcement of the government's policy with regard to the financing of the recent war, and the possibility of a large income tax, a shrinkage was caused in the market price of practically every security in the American market. You could not attribute that shrinkage any more to a change in the value of the physical properties than to a change in going concern value. The condition of the market in 1913 might be called "abnormally depressed" and the condition about the close of 1916 was a little more than normally buoyant. With the exception of the period immediately following the declaration of war, early in August, 1914, the condition was one of steady transition from the depression in 1913 to the exceedingly optimistic condition at the end of 1916. There was a period of total stagnation in the fall of 1914 during which the stock market was entirely closed, and that, we have not taken into consideration in this study at all because during that period we were unable to get any measure of value or any volume of transfers.

At the end of 1913, the Pacific Gas & Electric Company had a large investment in electric properties that had not yet reached an earning condition, and its earnings from its gas business in San Francisco were low due to the 75¢ gas rate. A very large volume of securities had to be marketed and payment of much "short time paper" had to be provided for. Conditions in financing and in earnings were not normal. Since then there has been an increase in net earnings, and a considerable decrease in the volume of securities to be marketed, so the change has been toward greater stability and more normal operation.

The first preferred stock of the Pacific Gas & Electric Company was placed on the market and disposed of during the summer of 1914. The result of the sale and issuance of this first preferred stock was that the gold notes and other temporary loans were retired very quickly and the market for Pacific Gas & Electric Company's bonds was strengthened substantially.

The last issue of the gold notes was refunded in the first quarter of 1915. From that time on, the condition of the Pacific Gas & Electric Company was fairly normal and reasonably safe from the point of view of the investor.

From the early part of 1915 to perhaps the middle of 1916, the market values of the stock and bond issues of the Pacific Gas & Electric Company approximated what I considered the normal value of the Pacific Gas & Electric Company's properties as a going concern with its established business.

The so-called Rule-of-Thumb methods of determining going concern value must be applied within the range of their possible usefulness and entirely in the light of the stability of the conditions surrounding the property. These methods must be applied with judgment and discretion and so must all other methods.

973 C. L. CORY, a witness called by the plaintiff, testified in substance as follows:

I reside in Berkeley, California, and am 44 years of age. I have been a teacher in the University of California for approximately 25 years, and have also followed the profession of consulting engineer for the last 17 years. My special subject in the University of California is electrical engineering. In the capacity of Consulting Engineer, during the period from 1900 to 1910 I have had to do with the construction of hydro-electric and steam power plants and the application of electric power in various industries. My position at the University of California is that of Dean of the College of Mechanics which college embraces the courses in electrical engineering, mechanical engineering, steam engineering, gas engineering and hydraulic machinery, in addition to my special work in electrical engineering. It is part of my duty to advise the University of California in a consulting capacity with respect to the installation of University property involving mechanical engineering work, electrical engineering work, heating and ventilation.

I have engaged in the work of appraising public utility and other property ever since 1907. My experience in the work of appraising or valuing public utility and other property has included two appraisals for the City of San Francisco in connection with the Pacific Telephone & Telegraph Company's property and equipment in
974 the City and County of San Francisco; an appraisal of the gas plant and system installed in Santa Barbara for the City of Santa Barbara; an appraisal of the gas property of the Modesto Gas Company for the City of Modesto; an appraisal of the Gas Department properties of the Bakersfield Electric Light & Power Company for the City of Bakersfield; an appraisal of the properties of the Peoples Water Company in Oakland; an appraisal of the gas and electric properties of the Los Angeles Gas and Electric Corporation; appraisals of property for the supply of power for mining industries in Utah, Alaska, Arizona and New Mexico; and appraisals for use before the California Railroad Commission in a rate case of the Mt. Whitney Power & Electric Company, in condemnation proceedings against the Palo Alto Gas Company, and in proceedings in connection with the re-organization of the People's Water Company and the fixing of rates for its successor, the East Bay Water Company.

I have also appeared and testified in connection with the so-called gas rate hearing in Los Angeles on behalf of the gas companies. That case was before the Railroad Commission also. I have also, during my experience as an engineer, acted as adviser to persons contemplating the purchase or sale of public utility property. I refer to the purchase of the properties of the Telluride Power Company operating in Utah and in southern Idaho by a company which is now known as the Utah Power & Light Company. I have made estimates of cost or value of property with a view to installation of new public utilities and the extension of existing public utilities.

One of these estimates was for a company whose system is
975 now a part of the Pacific Gas & Electric Company's properties,

that was the Suburban Light & Power Company that operated in the vicinity of San Leandro and Hayward in Alameda County. I worked in association with Mr. A. M. Hunt and Mr. Wynn Meredith as engineers for the construction of the properties of the Marin Water & Power Company. We had charge of the enlargement of that company's water supply and the construction of the so-called Phoenix Dam begun in the fall of 1905 and completed about May 1906.

In connection with my work in appraising or valuing properties, I have made a study of so-called going concern as an element in value, in other words, the value of an established business considered in connection with physical properties of public utility companies.

I have studied the different methods that have been developed or resorted to by engineers for the purpose of forming a judgment as to the going concern value of the property and business. I believe that I have studied the principal presentations in recent years of the value of the business of such companies as the Telephone Company, the Gas & Electric Companies, the Street Railway and Transportation Companies, and utilities of that character.

Beginning with the year 1911 and extending over a period of about three years, I did a good deal of work in the direction not only of the general appraisal but the actual determination of the cost of service for the Washington Power Company. This had to do with the cost of electrical service to very large consumers, principally the mining companies in Idaho, and also the cost of service to the street railway system operated within the City of Spokane and
976 owned by the Washington Water Power Company and the Interurban Lines of the Washington Water Power Company, extending out a considerable distance from Spokane.

In that general work of appraisal, the matter of values over and above the physical values were considered particularly.

There are several methods that have been adopted and used by Valuation Engineers in making an estimate of the going concern or established business value of public utilities. A very much used method has to do with a measure of the value of the business as determined from either an investigation of the actual cost of developing a business or, if the case is such that the actual cost is not available, an estimate of the cost of the development of the business in a comparative plant. That method seems to have been used to a very considerable degree. Another method has to do with attempting in each individual case to find the relation between the physical value or the estimated cost of reproduction of physical properties and the total value of such properties viewed as a going concern.

Another method which has been adopted and sometimes supported by considerable data of the past is the actual cost of obtaining each customer.

Another method which, so far as I have been able to learn, is more often considered in the actual transfer of property, is an attempt to connect, by some relation fitting the particular case, the gross revenue for a given year with the value of the business.

The attempt is sometimes made to determine the value of going concern by comparing the gross amount paid for an entire property and business at an actual sale with the appraised value or an
977 estimate of the cost of reproduction of the physical property.

I have also studied the method that consists in considering the market value of the securities that have been issued by a company that has been in operation for sometime. It seems to me that, if we are attempting to arrive at the value of the business of a public utility, there is no more direct method than to actually consider the value as reflected by the value of its securities when established by actual transactions. Whenever there is an absolute transfer of a property to an entirely different corporation, we have a definite measure of its value, assuming that the parties are dealing at arm's length. Outright purchases of utilities that are permanently established are rare. Ordinarily the larger and more complete the development of a public utility, the less frequently is an actual transfer or purchase made.

It is extremely difficult, practically impossible, to describe the mental processes by which a judgment as to value is formed. There are so many things to be taken into consideration that, while we may use certain mathematical processes and get certain results that may give us a measure of value, yet inasmuch as value is subject to change and actually does change, it is impossible to confine the whole process of reasoning to what might be called a logical mathematical presentation. In the final result, value is a matter of judgment as reflected in transactions between vendors and vendees. A judgment as to value should be based upon the most extensive investigation and the broadest consideration of ascertained facts.

I think the following circumstances should be given great weight in forming a judgment as to the value of any property and business, based on the value of the outstanding securities of the owning
978 corporation, viz: First, the permanence of a demand for the product; Second, whether the economic conditions, and all conditions which control the cost of the product for sale, justify a purchase of that product by those desiring its use.

I have in mind the studies made for the Washington Water Power Company. As early as 1911 that company was made acquainted with the reduction in its earnings caused by the introduction of the automobile, not only for passengers but for freight. Third, I think the matter of climate has an effect. A study was made some years ago to ascertain the proportion of heating and cooking done by gas in different parts of the United States. It indicated that a climate such as that of San Francisco and Los Angeles is particularly advantageous for the use of gas as a fuel.

With reference to the market-value-of-securities method of valuation unless there were a sufficient number of transactions of sufficiently large magnitude it would not be wise to be guided to a very great degree by these transactions in measuring the value of all the securities. If the securities, however, were large in amount and

were widely distributed and were quite generally dealt in, I would consider that such circumstances would entitle the market value to considerable weight in determining the value of the property and the business represented by the securities.

About three years ago when we had a preliminary hearing in the first one of these cases, I made a study in collaboration with Mr. W. G. Vincent of the going concern value of the plaintiff's gas property and business in San Francisco. I used a method that might be called the comparative or substitute plant method, based upon the consideration of such a plant as developed into the future.

That is a method which aims to arrive ultimately at what
979 might be called the reproduction cost of the developed business. It corresponds in a general way to an appraisement on a re-production basis of the physical properties. I have quite recently made another study of the going concern or established business value of the Pacific Gas & Electric Company's gas department business in San Francisco in conjunction with Mr. Vincent and Mr. Ryan.

The statement presented by Mr. Ryan (Exhibit 46) has been carefully and completely examined by me. In taking up the assumptions made in this statement I will only consider those carried to a final conclusion. First, the reproduction method under the head of "B," first set forth on Page 4, et seq. Mr. Ryan has adopted as a guide, a development of the business of the Metropolitan Light & Power Company from 1906 to 1911. That company made about 15% of the sales of gas in San Francisco in 1911. I have personal knowledge of the property of the Metropolitan Light & Power Company, I know the territory which it served and am more or less familiar with the conditions existing at that time. It seemed to me that the Metropolitan Company was operating in a part of the city rather advantageous to the large consumption of gas per meter as compared with the entire city and also that the cost of oil used to make gas was very small. The assumptions made in Exhibit 46 would be conservative as shown by an estimate of the cost of developing the entire gas business in San Francisco.

I am not inclined to give much weight to the final conclusions in Exhibit 46 drawn from approximations based on one year's gross earnings, or a per cent of the physical property, or the value of each meter, although they are useful as checks in
980 appraising the value of the property and business as a whole from other data. On page 28 of Exhibit 46 under "f," the approximations only amount to finding a sum (by some almost indefinable method) representing the value of the business, which may be equal to one year's gross earnings, or 50% of that, or 10% or 25% of the physical value, or \$10.00 or \$20.00 per meter. The value of the business is related to the annual gross earnings, or a percentage of the physical value, or the value per meter.

In a general way the value assigned to each consumer, or to each meter installed, is based very largely on experience as to the cost of development under reasonably normal conditions. I would take a great many things into consideration in attempting to estimate

the value of business in addition to a determination of its cost. The value of the business may fluctuate widely from day to day. Gross earnings are closely related to value, particularly the gross earnings after necessary operating expenses are taken out. I would not consider gross earnings a reliable guide in estimating value unless I had information concerning expenditures so that net revenue might be ascertained.

Referring to subdivision "d" under figure #2, Exhibit 46, "Value of Going Concern, Comparison of Net Earnings Method." That method is very closely related to the reproduction method. The comparison of net earnings method involves the comparing of a going concern with an established business, to a hypothetical plant developed from its origin to a point where its earnings become comparable to those of the company that was in existence and had its established business when the hypothetical company started.

Referring to the presentation in Exhibit 46 on page 28 981 under the subdivision "g," "The Market Value of Securities" it seemed to me that there was a definite estimate of value. It of course depends upon the determination of the value of the securities as reflected in the sales.

I recognize that we are dealing with market value as reflected in the sales of securities of the Pacific Gas & Electric Company of which the gas business in San Francisco is only a part. In order to get a definite result for the value of going concern we must have a properly established value of the physical plant, because it is a mathematical process to ascertain the total value from the market value of the securities and then deduct from that the estimated reproduction cost of physical value in order to get the value of the intangibles or going concern.

In my opinion, as I have gone over the exhibit and supporting data, I would be inclined to give as a very definite measure of the value of the business, the figure there determined or the sum \$3,208,560.00, taking into consideration the fact that the gas business in San Francisco has been established for a long while. Certainly there are few, if any, gas manufacturing companies that have progressed from an economic standpoint any more rapidly or firmly than the gas department of the Pacific Gas & Electric Company as reflected by its business in San Francisco. The demand for gas service in San Francisco has increased and has continued over some rather serious difficulties such as the Fire in 1906. From a purely economic standpoint, with gas at approximately the price 982 which has been paid for it by the consumers in San Francisco, it is the kind of fuel particularly adaptable to the needs of the people and is used to a considerable extent. I should therefore feel that as definite determination of value this figure should be given the greatest weight of any of those set forth in the exhibit.

As far as the going concern value of the Pacific Gas & Electric Company, its gas department, and the property in the business in San Francisco is concerned, I would be inclined to name the figure \$3,208,560.00 as my best possible estimate of the value of the business on December 31, 1915. I would not be inclined to accept that figure

without giving consideration also to figure under "b" or the cost of developing going concern by the reproduction method, represented by the figure \$2,436,439.00.

I firmly believe that cost does not measure value. At the same time a figure representing the cost of developing the business has been determined from assumptions as close to actual facts as they can be since they are based upon the history of the Metropolitan Company.

I would also take into consideration the figures under "h," using the Metropolitan Light & Power Company data first, for the development cost based on the consumers, the development cost based on physical values, and going concern value based on the sale price.

I do not know definitely what conditions controlled the sale of the Metropolitan Company to the San Francisco Gas and Electric Company, but I know what the conditions were in San Francisco as to competition at that time.

983 The actual difference between the total amount paid and the estimated cost of the physical properties as shown by the record would indicate that that was not an abnormal transaction, but a transaction that was reasonable and desirable from the standpoint of both companies. The amount shown on page 28 of Exhibit 46 as the "going concern value, based on sale price," of plaintiff's San Francisco gas properties is proportional to the amount that was paid for the going concern element of the Metropolitan Company's properties.

About the time of the sale, the Metropolitan Company's business had actually commenced to drop off. A successful method of manufacturing gas from oil had practically been demonstrated by the San Francisco Gas & Electric Company. The sale appeared to me to be normal and for the best interests of all concerned, including the consumers. It would be, in my opinion, a reliable guide for making an estimate of the going concern value of the plaintiff's gas property and business here in San Francisco although it would not be absolutely conclusive. I wish to be understood that the best measure of value of going concern available to me based upon the data in Exhibit 46 would be the figure \$3,208,560.00. I do not say that my conclusion rests upon that solely. It rests also upon "b" under No. 1, which is clearly a determination of the estimated cost of reproducing the business, also upon No. 3, under "h," a figure indicating at least by analogy the value of the business as represented by the sale of the Metropolitan Company.

The figures on page 28 of Exhibit 46 would assist me in concluding whether there was something unsound in the determination of the figure under "g," namely, \$3,208,560.00. I consider that the figure under "d," namely the comparison of the net earning method determined by the comparison of the comparative plant and the existing plant is really but a modification of "b" under the figure No. 1

984

I recognize the importance of determining such figures as No. 1 "c" which is \$4,779,092.00 and No. 2 "g" security liabilities \$5,-182,545.00.

On cross-examination the witness testified in substance as follows:

Referring to the principal sales in which I represented one side or the other and made appraisals, I think the only instance where an actual transfer of the property took place was that of the Telluride Power Company. That Company was a corporation having properties in Colorado originally and later, about 1900, in the general vicinity of Salt Lake City and still later in Southern Idaho, which was a hydro-electric over transmission property exclusively. The difference between the actual consideration and the value of the physical properties represented approximately the difference between \$8,250,000.00 and \$10,000,000.00. It was generally considered, although I have never heard anyone of the interested parties definitely state it, that the difference represented going concern value. I inferred, although I was not present at the negotiations, that the sum over the appraised physical value of the plant was for all intangibles.

985 In the Bakersfield case, I made an appraisal of the plant but I did not include a separate allowance for going concern. The title of the case was the Bakersfield Gas & Electric Company vs. the City of Bakersfield, before the Railroad Commission. That was the only case before the commission in which I represented a Municipality or any public municipal corporation.

In the Palo Alto Gas case, I do not know whether my figures for going concern were approved or not, but the Commission found the valuation in excess of the one which I had submitted in behalf of the company, or in excess of the figure representing the physical plant and working capital. The physical plant in that case as represented by the cost of reproduction new was \$60,843.00 and the fair valuation of the property as found and upon which rates were fixed was \$69,250.00 giving a difference of \$8,407.00. The figures are approximate. The decision stated that going concern value had been taken into consideration. So far as I know there are no cases decided by the California Railroad Commission where any definite sum has been set aside as approximating the value of the business, although in a very great number of decisions it is definitely stated that the value of the business has been given consideration in determining the fair value or what is sometimes termed the rating base.

The appraisal I made in March 1907 of the Suburban Light & Power Company preceded by a good many years the actual transfer. The appraisal was made for two purposes, first, to determine the best way to develop the property further, and second, for the use of the company in modifying its financial arrangements. The appraisal was not made for sale purposes.

986 I think I am familiar with the investment theory adopted by the Wisconsin Railroad Commission to ascertain going concern value. It seems to me that the so-called Wisconsin method is a satisfactory method for a normally successful property. I recognize that if we apply the so-called Wisconsin method or the investment idea of developing a business to a property which has been unsuccessful for any reason we have the apparent anomaly of attempt-

ing to use as a measure of value an expenditure or cost which conditions have not justified. The early deficits will be the greater if the property is particularly unsuccessful. Our application of such a measure of the value of a business must be confined to a successful property wisely managed and where service is in demand. I don't know that the Wisconsin Commission has always made that limitation on its employment, but it has seemed to me that in most cases they have applied that method to a successful property.

The so-called Wisconsin Method is the determination from the original records, and in some cases from certain assumptions, the early history of the property in the development of its business, taking into consideration the expenditure during the early history of the plant, its revenue, the interest upon the investment, etc. I have no quarrel with the method, but I feel that we must carefully discriminate as between cost in this relationship, namely, the cost of developing the business, and the value which may be the value of the business, at any particular time. We are always confronted with the problem about the value of the business. We are attempting to arrive at an approximation or a definite figure for something which we

987 know varies. It is absolutely certain that the value of any thing will vary from time to time. To illustrate what I mean:

If I purchase a piece of real estate, either improved or unimproved, there is a certain cost. If I have paid a certain sum of money I can, by properly considering the revenue, (if there be any) and the taxes and interest, determine the cost of that piece of real estate. Now for me at any particular time to use the cost so determined as an infallible measure of value is without any question ridiculous. It may be of assistance as a guide, but the value will vary quite independently of any mathematical figure I may develop as to the determination of its cost.

I understand that early deficits might be entirely eliminated by later profits, but to deduct from the cost of developing the business the later profits and perhaps get a figure which would be zero or a negative figure would be to my mind absurd.

If we are attempting to get a real measure of the value of the business, I am inclined to take the analysis that I gave on the first consideration, namely, the method of deducting from the total estimated value of the property both tangible and intangible the value of the physical property.

With reference to the investment theory,—the method should not be applied in a case where mere preliminary examination reveals that the value of the utility is negligible, practically nil. If a study employing any of the cost methods does not give a going concern value, then obviously the methods are not proper to use in that particular instance.

988 It is possible to find properties which have made money from the beginning with no deficits. I think in my experience that was true of very many of the early hydro-electric plants. It was true of the Northern California Power Company (as long as it was the Keswick Power Company) furnishing power to the copper mines in Shasta County. There was a brief period when

it did not make a profit, but measured at about 1904, the Northern California Power Company might very properly have had ascribed to it a value for the business which it possessed. Now to say that the Keswick Power Company, predecessor of the Northern California Power Company, at no time had any value as a going concern because as a matter of fact it had practically no early deficit, would not, in my mind, be conclusive at all.

I have always felt that it is much better to say that we will make these studies, whether of the comparative plant or not, (if you have the original data as the Wisconsin Commission had,) merely as a guide or check.

I don't believe that one would be justified in setting up definitely and finally as the best measure of the value of going concern a mere analysis of the cost of development.

There is no question but that the Los Angeles Gas & Electric Company, furnishing about 85% of the total gas service to the Southern California Urban population in Los Angeles and vicinity, has a definite value from its business. But if you attempt to get as a measure of that value, early deficits, or even deficits up to the present date, it will be of no assistance to you in arriving at a conclusion as to the value of that business. There are instances where these methods are not of value in determining the best measure of the
989 value of going concern. Whenever we can use cost as a measure of value, it is of value but not conclusive.

There is no definite mathematical process with which to arrive at the value of anything as complex as the value of the business of a public utility property. I don't say that it is necessary to arrive at a separate and definite figure; because in a great many cases a very close approximation can be made by taking all of the facts into consideration. If we definitely understand that we are making an estimate of the value of the business, we can establish that the value of the property as a whole, intangible and physical, is fairly represented by the value of its securities. Then we can determine similarly the reasonable value of the physical plant. Subtracting the latter from the former, you have a very definite measure of the value of the intangibles, in which the value of the business might not be the only element. The proper thing to do to check up or modify the conclusion thus reached is this: Take the assumptions as nearly as they may be determined for the comparative plant, making these assumptions the same as absolutely existed in the development of the real plant. Then work up the cost of the development of the business until it is placed on a definite substantial paying basis, giving service to customers anxious to receive such service, and doing it economically as compared with other plants of the same character. I think such an analysis is valuable and many times the only measure of the value of the going concern we can adopt. This plan is strictly analagous to the cost of reproducing the physical plant.

We are using a method which is of the same character,
990 namely, analysis of the conditions in order to approximate the cost of reproducing the business. We must definitely

understand that we are in error if we give weight to either the value of the securities of a public utility or weight to the cost of the development of the business as shown by the early deficits, if there are other factors of greater importance modifying the application to any particular case.

Let us assume that in the present case we find by the value of the securities method that approximately \$3,000,000 would represent going concern value. Assume that you had had available records of some of the larger constituent companies of the Pacific Gas & Electric Company which originally carried on the gas business in San Francisco and found that the profits earned by those companies in the earlier years were so rapidly gained that practically no actual deficit was incurred. I would say, that case was one where the determination of the cost of developing the business was not directly applicable as the best method of estimating the value of that business. You would have no measure of cost.

I cannot conceive of going concern value being measured within the values of the physical properties, without any separate and additional allowance for it. Going concern and physical properties are separate and distinct.

I can imagine the gas business of the San Francisco Gas & Electric Company being shifted twenty-five miles East, where it is physically exactly the same, and with as efficient an organization as it now has, but with no consumers and no prospect of getting any. To my mind there is no equality between that imaginary situation and

the situation which exists today with respect to the existing
991 plant, with more than 100,000 consumers, giving a desired service at a cost which is not deterrent and with every condition favorable for not only the permanency of the use and demand, but also the permanency of the quantity required. Going concern is certainly a separate thing.

It might be fair to say that to some extent the fact that a business is a going concern is reflected in the value of the real property that it occupies and the fact contributes its bit toward increasing general real estate values found in the neighborhood. If you buy a piece of real estate you know perfectly well you are buying a certain physical thing, but unconsciously or consciously its surroundings are taken into consideration. Taken as a whole, each industry contributes its bit toward building up industrial realty values. The demand for labor and materials also has had its effect on the prices of realty. If at a given date you add all together, real estate and materials and labor in building up the reproduction of the physical structures of a plant; to see if the reflection of going concern value has been eliminated, all we need do is to look at some other utility, for instance, the street railway system in San Francisco. Reasoning, that the concentration of the urban population, the demand for labor and the increased cost of materials, etc. have had an effect upon the physical properties, we find, on looking at the railways, that such an hypothesis falls to the ground at once. I don't think the sole difficulty of the street railway system of San Francisco is in the limitation of the term of its franchise. The fact that there are different

methods of transportation available and competing, is another reason.

992 I should say the principal influences which ordinarily affect the market price of public utility securities are legislative changes; economic changes, a definite demand in some quarter for the securities; and rate changes.

I would not consider the value of securities as a measure of the value of the property both tangible and intangible unless the value of the securities is considered over a considerable length of time, and their sale prices intelligently interpreted.

The market for hydro-electric power in some vicinities has been unusually large during the last few years. It has increased in Central California very definitely, but not in Northern California. The increase in demand in Central California is due to the increased consumption of power for manufacturing purposes. All of which tends to enhance the value of the securities of a company having a large hydro-electric business such as the Pacific Gas & Electric Company,—unless it were taken into consideration at the same time that the company found it necessary to build additional generating and transmission systems to take care of the demand. I understand that the expenditures of the Pacific Gas & Electric Company for new hydro-electric development and for additional transmission lines steel towers and distribution systems, have been very extensive. Alone, this fact might tend to decrease the selling price of securities, although it would presumably make a physical property still more valuable.

As far as the Pacific Gas & Electric Company is concerned, there has been no falling off in the demand for electric power.

During the past month or six weeks I have spent a great
993 deal of time with Mr. Ryan in going over his work, being asked early in April to take up this study. When I first looked over Mr. Ryan's work in April I gave particular attention to the different methods that Mr. Ryan has presented, to the details of what I would call the supporting data, (those pages following 29), and the methods adopted in accumulating and tabulating this data. I approve of the supporting data on page 30, concerning time factors assumed in the comparative plant.

In my affidavit in this case (in connection with the preliminary injunction proceedings) I built up a going concern value by the comparative plant method. In that estimate I assumed the reproduction would begin January 1, 1913 and estimated to January, 1919. At the time I thought six years would be enough in which to build up the plant. The affidavit was an estimate based upon assumptions that are not substantiated when contrasted with the complete presentation made by Mr. Ryan.

I did not go over any of the original data which Mr. Ryan used to check him up. My evidence would be corroborative of the method Mr. Ryan used, rather than of the particular data upon which his estimates are based.

We have to rely upon the Metropolitan Company's statements as to what its assets were.

Taking the gross amount of \$98,000,000.00 determined by Mr. Ryan and applying to that the Jones' appraisal, including working capital, and obtaining a percentage as he did and then applying that percentage to the gross selling value of the securities in order to obtain what you consider the market value of the San Francisco

gas properties, I do not know what would be included in the
994 total of \$114,519,000.00 odd. I assume the market value

of all the tangible and intangible properties, determined by investors. In that case it would include the value of water rights. If you apply 15% to that total, in order to find the market value of the San Francisco gas properties, I should not hesitate to say that you include that percentage of all elements which are considered as part of the property, intangible or otherwise.

I would not say that the net earnings of a company are the principal factor in determining the value which the investor is willing to pay for its securities, but I would say that it is the most important factor. In my opinion it is a factor which is more likely to cause a variation in market prices than the question of the intrinsic value of the assets of the company.

The investor is more quickly affected by a fluctuation in the earnings than the value of the physical property. If the Pacific Gas & Electric Company had accepted the opinion of the Board of Supervisors as to reasonable earnings and had adopted the 75% rate, instead of enjoining it, it is probable that the market value of its securities would be somewhat less than they have been, for a brief time at least. If rates for gas in this particular case were doubled, it certainly would not, in my opinion, permanently increase the gross revenue or the net revenue. It would probably diminish it. In my experience an increase of rates after a period during which rates have been at a certain figure, very definitely and very quickly reduces the income because of the historical fact

that all services rendered by public utilities have, in general,
995 dropped in cost continuously. When the cost is for any reason increased, the psychological effect upon the consumers is very marked in reducing the use.

The reduction of gas rates in Los Angeles seemed to increase consumption, but in Los Angeles as they use natural gas what they are really purchasing are heat units rather than a number of cubic feet of gas.

The affidavit prepared for the preliminary hearing gave a construction period of seven years, namely, the years from 1913 to 1919 inclusive. As compared with the same use by Mr. Ryan, the years that were required for construction were the same. Mr. Ryan used a two year period for preliminary investigation reports, incorporation and promotion, making a total of nine years used by him, whereas in my preparation for the preliminary hearing, the two year assumption for getting all of the preliminary data was eliminated entirely and not considered. I think that on the basis of the more extensive investigation made by Mr. Ryan, the preliminary two years are properly included and also an item for the cost of the preliminary work which was not considered in the preparation of

the previous affidavit. I was familiar with the gas situation in San Francisco during the ten years prior to the sale of the Metropolitan, but my knowledge of the Metropolitan Company is very slight, except from general knowledge of the gas situation in San Francisco.

The Metropolitan was a competitor of the San Francisco Gas & Electric Company. Whether there was any threatened rate war at the time of the consolidation of the companies I could not say. I have heard of public utilities buying up competitors to either avert or terminate competitive conditions. The price paid under those circumstances would not necessarily reflect true going concern value, but might be a "hold-up" price. I think the Metropolitan Company was originally started for manufacture of coke. This original intention of manufacturing coke did not work out very well and did not pay. I do not know whether they were able to use much of their equipment in the manufacture of gas or not.

In 1899 I was called in to give some advice on the electrical distribution system of the Independent Company. We were concerned with the voltage, the system of transmission and details of that character for the electrical distribution system. The Independent Gas & Power Company was organized in the early part of 1901. They got gas works into operative condition about a year after that. Assuming that they were selling 15,000,000 feet monthly, my recollection would be that the gas business of the Independent Gas & Power Company was not as large or as extensive as that of the Metropolitan Company by 1911. I don't know whether the Independent Company was making money by the end of the first year of its operation. My impression is, that as far as the gas business was concerned, it was not making money. Their distribution system had been rather completely and expensively built. Large mains were put in for the future, and there were not sufficient customers purchasing gas to justify the size and the extent of the distribution system, which was practically built all at one time. Whether the building of the gas plant and the building of the distribution system compared or were coincident, or whether one was built better than the other or not, I do not know. I was in no position to acquire data about the operation of that company which would enable me to state more definitely the results of its operation. My relations with it were as stated above.

On redirect examination the witness testified in substance as follows:

Where a company purchases a smaller competitor both would be materially influenced by the anticipated profitableness of the business carried on without competitive conditions, as based on their experience with the period during which they were in competition. Speaking very largely from actual memory the Independent Light & Power Company and the Independent Gas & Power Company were disposed of by Mr. Spreckels only after he had been offered his price.

In my experience the rates that may be charged for a product of

the public utility are definitely and rigidly affected, quite independent of any regulation, by economic conditions. Any public utility of any size finds itself with what are called small consumers and large consumers. A fluctuation of a very small amount in the sale price to the large consumers will very quickly determine whether such large consumers will substitute another form of service for the one they are getting. If the price is increased above such a figure the consumption will fall off. On the other hand the small consumers, or individual householders, are not so quickly affected, providing the service rendered is the most economical and the most satisfactory to be used.

When we go beyond the limits, either in the increasing or diminishing of the cost of the commodity for a given service we encounter economic conditions which will very many times actually change the results into the opposite of what we might have expected.

The opportunity for play between value of plant and price of service is limited by economic conditions. That is particularly true, as I have observed it, on the Pacific Coast where the rate of growth is excessive. If you get into an old established community such as the small Eastern urban centers of population, you will find that things are practically definitely established, and it seems as if no change could be made one way or the other without seriously affecting the whole situation. The only further observation I have to make on this point is: That we must give consideration to the fact that there are certain consumers who are constantly studying the economic side and who are concerned with cost of service. They analyze it and keep a very careful record of that part of the situation. There are, of course, other classes of consumers, primarily those who use small quantities in the home, who find the financial burden of no consequence, and who are absolutely indifferent to the economic side or the desirability of reducing cost of making a change in the form of service rendered. It is a mistake in trying to determine the actual cost of service for different classes of consumers, to neglect the first class of consumers. They many times utilize a very large amount of the public utility's product, and for them the question is constantly arising as to whether a change is desirable, whether it be in fuel or power, or any other form of service.

1000 W. G. VINCENT, JR., a witness recalled for the plaintiff, having previously qualified as a Valuation Engineer, testified in substance as follows:

I have, during the last seven or eight years of my work as a valuation engineer, gone specifically and particularly into the question of going concern value. I have been very much interested in the various methods used in presenting it and the theories suggested as to the proper basis of determining going concern values. I have read practically all the papers and the various decisions of courts and commissions referring to going concern values and in many cases I have analyzed them and have gotten additional information for

that purpose, information in addition to that which appeared in the decision itself.

My work in this connection has been largely before the California Railroad Commission. I have not dealt with any going concern value for the purpose of a sale.

In 1913, in collaboration with Prof. C. L. Cory, I made a special study of the plaintiff's gas properties in San Francisco and of its business conducted by means of those properties with a view to ascertaining what, if any, value was to be attached to those properties because of the established business conducted by means of them. The results of that study were incorporated in an affidavit made by Prof. Cory in the preliminary hearing in the first of these cases. During the past year I have collaborated with Mr. J. T. Ryan in
1001 the detailed presentation which he has made here and given in Exhibit No. 46. Mr. Ryan is in my department and he has made up these studies. It has been the main part of his work for several months past. During the course of his studies and investigations, I have been consulted by him and have advised him on the various estimates and the use of the various data which he had worked up, the obtaining of information as to the Metropolitan and all other information which he used.

In the preparation of Prof. Cory's affidavit used on the hearing of the order to show cause in the first of the causes now on trial, I did a large part of that work myself in conference with Prof. Cory and worked up a lot of the detail figures, going over them with him from time to time. That study was made much more hurriedly and was not as complete as the one made with Mr. Ryan. It was made on a different basis of assumption and in its preparation a different method was used. I would not say that I have yet sounded all the depths and searched all the possible ramifications of the subject of going concern; but I think I have made progress since the work done with Prof. Cory in 1914 in preparation of his affidavit.

The Going Concern value of the plaintiff's San Francisco gas business as appraised by Prof. Cory in the aforesaid affidavit was approximately \$2,850,000. After deducting the interest during construction which had been included in the valuation of the physical
properties used.

1002 I have been present in court and have heard the testimony given by Mr. Ryan and Prof. Cory. The general methods and principles employed by Mr. Ryan in working up the formal statement read by him (Exhibit No. 46) have been pretty well set forth. There are however one or two comments which I would like to make with reference to some of the methods, points which have impressed me particularly and possibly have not been touched upon. With reference to the "reproduction method" (marked "1-b" on page 28 of exhibit No. 46) the criticism usually directed to this method is to the effect that it requires the making of so many assumptions in the working out of the results. My experience has led me to the conclusion that, taking any reasonable assumptions, the results obtained by the employment of this method

will not vary very much; in other words, I believe it would be just as easy to get two experts to agree on the basic assumptions in working out such a method as this reproduction method as it would be to get the same experts to agree on physical property values.

In the case of physical property, we work on a basis of opinion largely based on experience and construction costs; and, in the case of going concern, we are working on opinions, to a certain extent, based on experience of operation and commercial experience. I have not found that the variation in the result has been very great,

even though some of the assumptions might be quite different in the two different cases. There are a few fundamental assumptions that affect the results very decidedly; but these can be worked out usually with fairly definite limits within which assumptions necessarily are to be made.

It is necessary in valuing physical plants and properties, as well as in valuing going concern to bring into the problem, at all times or at least very frequently, the experience of men who have had to do with the construction of plants and the development and conduct of the business. That is almost the entire basis of the making of estimates of that kind. In one case you may have more actual pertinent data to work upon than in the other. In the final analysis, value is a matter of opinion based on experience.

The reproduction method has one very strong point which in a way answers the question brought up by Mr. Searls about the vicious circle, and that is this: While the rate assumed on which the revenue is estimated has a very decided effect on the result, it has, however, a different effect in this case than in the case of the comparative net-earnings method. For instance, if in working up this reproduction method you should assume dollar gas during your reproduction period, your resulting development cost would be much less in total than if you assumed ninety cent gas; and again, if you assumed eighty cent gas, you would have a still larger figure for development cost. There is, therefore, a tendency to come to a point of equilibrium in the rate and going value when this method is used.

On the other hand, when the comparative net-earnings method is employed, the higher the assumed rate is in the case of the existing plant, the greater is the difference in the net earnings, hence the greater difference in the determined going value; and if you substitute your determined going value back in the valuation of your plant, you get a still higher rate, and the effect is one of lifting yourself by your boot straps.

The reproduction method has a tendency to reach a point of equilibrium where there will be a balance between the development cost obtained and the rate. That is a very significant difference between those two methods and I don't know that it has been sufficiently bought out.

In connection with the actual figures as worked out by Mr. Ryan, the figures in the comparative net-earnings method are affected by several causes and would have been higher than he has given them here, had it not been for two important factors, one being the low

rate during 1912-13 when the 75¢ rate was charged, and the other being the heavy expense of the strike in 1913.

In the market value of the securities as obtained by Mr. Ryan, the value which he has used here is based on the normal market value of the securities as reflected in the day-to-day sales at a particular time, I think the first part of 1916. While this represents the exact value of a part of the securities of the plaintiff, I am somewhat doubtful as to whether that is not a minimum value which should be
1005 placed on the property by the use of the securities method, as it would cost a great deal more than the market value to obtain all or even a large part of the securities of the company. This has been reflected in a number of transactions where a sum considerably in excess of the market value of the securities has been paid in order to acquire a property as a whole. It means that those who continue to hold their securities at prevailing market prices will not part with them unless a higher price shall be offered; and it also means that a large part of the securities being sold from day to day are sold because the seller is forced to sell for some reason aside from the merits of the property. Sometimes he has to raise money for his personal needs. Just how much above the market price the value of the securities really is I do not know.

In considering the various methods and the relative weight which I would give to the different ones, I would say that the reproduction method and the market-value-of-securities method seem most important and most definite to me, having in mind that the market-value-of-securities method includes and reflects items of value which are not included in the reproduction method.

The reproduction method covers solely the development cost; the market-value-of-securities method covers other elements such as the value of a tried, trained and efficient organization, favorable
1006 contracts, efficient purchasing ability, the unified system, patent rights and such items; those elements are not so much reflected in the reproduction method. I consider the comparative-net-earnings method as next in importance, although this method has its weaknesses.

The facts with reference to the increase of the earnings from the electric business and the earnings from the gas business of the Pacific Gas & Electric Company during the past ten years or thereabouts, are as follows: On page 9 of the tenth annual report of the Pacific Gas & Electric Company which covers the year ending December 31, 1915 (Defendants' Exhibit No. 104), is given a table showing what percentages of the plaintiff's total gross revenue have been derived from the business of its different departments. In 1907 the electric department gave 56% of the total gross. In 1915 the electric department gave 53% of the total gross. In 1907 the gas department gave 36% of the total gross. In 1915 it gave 40% of the total gross. I am talking about the gas business as a whole. These changes were generally in the direction as indicated, although certain fluctuations occurred from year to year. The new gas companies acquired by the plaintiff during that time were the Metro-

politan in 1911 and the Los Gatos Gas Company in 1912. The same statement (p. 9 of Exhibit No. 104) shows the revenue in dollars derived from the plaintiff's gas business and from its electric business separately for those same years. In the year 1907, the electric revenue was \$6,316,000. In the year 1915 the revenue of the electric department was \$9,924,000. The revenue of the gas department in 1907 was \$4,086,000. and in 1915 \$7,560,000.

From my study of the question and my analysis of these figures (i. e. the figures in exhibit No. 46), as well as other information and my general knowledge of the system, I believe that three million dollars approximately represents a fair value for the going concern of the plaintiff's San Francisco Gas properties.

On the market-value-of-securities method, Mr. Ryan has reached the figure of \$3,280,000. as representing the value of the going concern by the use of a direct ratio between the San Francisco gas properties and the total physical properties of the company. There are several elements which affect this apportionment of the market value. The market value might, to a certain extent, reflect the value of the company's water rights. On the other hand, in some of the company's properties there is unquestionably no such element of value as going concern, that is to say there is quite a proportion of the physical properties of the company that, in my opinion at least, would not have attached to them any additional values as going concern, and even some properties where the going concern value would be considered a minus quantity.

I mean that there are certain parts of the company's properties and plants that are really unprofitable. There is some non-operative property included in the \$98,000,000. figure referred to by Mr. Ryan, but not much undeveloped or only partially developed property. There are some non-operative lands and some undeveloped lands. There are no water right values as such in the \$98,000,000. figure except as may possibly be reflected in the land values of reservoir sites.

I was connected more or less with the whole appraisal that was made by the J. G. White & Co. I was in charge of the office in San Francisco and had to do with all of the various departments to a certain extent. I know the methods that were used by J. G. White & Co. and am familiar with the work that was done by the several engineers and others who participated in the preparation of that inventory and appraisal. I believe the figures were carefully obtained and were accurate and that the methods employed were properly used. I have however probably gotten a better over-all view of that inventory in the last five years. I have used it in a great deal of my work and have had occasion to check it up very often in connection with various estimates for use in rate cases and in connection with replacements and questions of that kind so that I really feel I am in a better position to have a general opinion as to the accuracy of that inventory at the present time than I had five years ago.

1009 On cross-examination conducted by Mr. Searls, the witness testified in substance as follows:

The Pacific Gas and Electric Company acquired the Suburban Light & Power Company about 1910. The Suburban Light & Power Company bought practically all of its gas from the Pacific Gas & Electric Company in the later years of its operation, buying the gas at wholesale and distributing it. The Pacific Gas & Electric Company started selling gas to the Palo Alto Gas Company in 1907. The principal gas properties owned outside of San Francisco are in Oakland, Sacramento, San Jose and Fresno. The rate of growth in Oakland and in that territory may have been greater than in any other portion of the territory although San Francisco has increased greatly since 1907. The growth has not been phenomenal in Sacramento. The growth in Fresno has been quite rapid, in San Jose not so rapid. By reference to page 65 of Exhibit No. 46, you can see that the income from the plaintiff's gas properties in San Francisco has almost doubled between 1908 and 1915, having increased from \$2,640,000 in 1908 to \$4,233,000 in 1915. The latter figure includes the exposition gas business so that probably \$3,800,000., the income for 1914, would probably be a more normal figure than the figure for 1915.

1010 I think that, in the period from 1908 to 1915, the plaintiff's investment in electric properties has increased more than its investment in gas properties because of the large amount of construction in hydro-electric properties, the cost of which has been very heavy.

Mr. Ryan compiled the Metropolitan data, and I reviewed them with him from time to time as he made them up. The item of \$87,000, shown in Mr. Ryan's statement as the cost of the real estate which that company had, was, I think, taken from that company's books. I think the main books were destroyed in the fire although some of the records and some entries indicating expenditures prior to the fire were not destroyed.

We found a piece of property on the books at \$200,000 and when we found that they had only paid \$87,000 for it we put it down at \$87,000. In other places where we found plants and structures valued at a certain amount and we knew that the plants and structures were worth more than that, we changed the figures. We used the figures which we thought most nearly coincided with the facts. The depreciation allowance used in Mr. Ryan's study was an estimate.

1011 W. G. VINCENT recalled for plaintiff testified in substance as follows:

A statement showing the prices at which various securities of the Pacific Gas & Electric Company were sold during the period involved in this controversy has been compiled under my direction. The information contained in this statement was obtained from the records of sales of unlisted securities of the San Francisco Stock & Bond Exchange, such records being taken from the daily sales sheets

kept on file in the office of Sutro & Co. and from the record of the listed securities of the San Francisco Stock & Bond Exchange as published in Walker's Manual of California securities, which manual contains the records of the high and low sales each month of the stocks and bonds listed on the San Francisco Stock and Bond Exchange from the year 1905 up to and including the last year for which it is published, in this case 1916. In order to check up to a certain extent these published figures in Walker's Manual I compared some of the monthly reports, the official reports of the Stock and Bond Exchange with the figures in the manual. Of course, I did not go over all of them in that way. The stock sales shown in this statement prior to the end of April, 1915, were taken from the records of sales of unlisted securities because the stock was not listed until that time. All other quotations are from records of sales of listed securities.

The three bond issues included in this statement cover 1012 about \$53,000,000 par value out of a total for all bonds issued or assumed by the Pacific Gas & Electric Company of \$76,000,000.

The bonds that have been omitted from this statement are underlying bonds, secured by divisional mortgages executed by the component original companies. The amount of the various issues of bonds appears on page 71 of Exhibit No. 46. The amount of California Gas & Electric Unifying and Refunding Bonds outstanding on the first of January, 1916, was \$19,698,000.

On the first of January, 1917, there were \$29,982,000 of Pacific Gas & Electric Company General & Refunding Bonds outstanding. The bonds of this issue have been used by the plaintiff for its financing since the beginning of 1912. The stocks that are covered by this statement are the first preferred, the original preferred and the common stock, running to a total par value outstanding for the three issues of approximately \$56,600,000 in the hands of the public. Of this total, approximately \$34,000,000, par value, was common stock.

NOTE.—The statement concerning which Mr. Vincent testified was introduced in evidence and marked Plaintiff's Exhibit No. 57. This exhibit shows the high and low prices of each of the plaintiff's three classes of stock, the California Gas and Electric Corporation's 1013 general mortgage and collateral trust bonds and unifying and refunding mortgage bonds which had been assumed by the plaintiff, and the plaintiff's general and refunding mortgage bonds, for each month from January 1912 to December 1916, with the exception that quotations for first preferred stock begin in February 1915. It is not deemed necessary to insert a copy of this exhibit.

On cross-examination the witness testified as follows:

Mr. Ryan in Exhibit No. 48, gave the market value of securities at the end of the calendar years. For common stock at the end of

1913, he used \$35.00; at the end of 1914, \$43.00, at the beginning of 1916, \$60.00, and at the end of 1916, \$64.00. In his final study, he used \$60.00, which was the price given for January 1, 1916. That was not the average for these years. There were 340,000 shares of common stock outstanding, the value of which fluctuated between \$32.00 and \$64.00 or \$65.00 per share, which would give a fluctuation of about \$10,000,000 in market value during that period, due largely to the cessation of payment of dividends. I do not think the fluctuation downward indicated the disappearance of going concern value. It would have been very unusual if the securities had not fluctuated under the circumstances and conditions existing at that time. The latter half of 1913 and part of 1914 was a 1014 period of financial stress and disturbance; and in 1913 there was a strike of plaintiff's gas and electrical workers. I don't think the San Francisco gas business controls the price of the plaintiff's common stock on the exchange. The general condition of the company's business as a whole, the general market conditions, and conditions generally would affect the price of stock whether gas rates remained the same or not. This litigation over gas rates has had some effect.

1015 Mr. JOHN A. BRITTON, recalled for the plaintiff, having previously qualified as an expert in the construction, operation, management and valuation of gas properties, testified in substance as follows:

I have read plaintiff's Exhibit 46 which was prepared by Mr. James T. Ryan and incorporated in his testimony with reference to the going concern value of the plaintiff's San Francisco gas property. My judgment is that Mr. Ryan has been entirely too conservative in his estimates. I think he has rather overestimated the amount of time necessary for preliminary investigation, report, incorporation and promotion, for which he allowed two years. But the time allowed, six years, for construction plans, specifications, contract letting and construction, and the overlapping period of six years for the acquisition of business, are, in my opinion, too short. I do not think he has taken into consideration (probably because he has not had operating experience for any length of time) the difficulties that would surround the building up of a system in a city like San Francisco in that period of time. I should say that, if it were accomplished in ten or eleven years, it would be a splendid piece of work to promote the use of gas as we have here and in other places, to meet the competition of electricity and all the difficulties of the laying of mains and the development of business in the district. I doubt very much from my experience whether it could be done in nine years. It would have to be rather a hurry-up job and 1016 would not be as complete and thorough a piece of work as if a longer time were taken to do it.

In expressing this opinion, I am assuming an organization comparable with what we have. I do not believe that men, new to the gas business, with very little experience in it, could build it up in

twice that amount of time. It takes particular experience and adaptability to work up the business of a gas company. It is necessary to educate your organization as well as to educate the public to the use of gas or electricity or any other commodity which previously was not in general use. Six years is too short a time for the entire construction of the gas manufacturing plant and the gas distribution system. The plant might be built, and would in my judgment be built in units to take care of a reasonable amount of consumption assumed by a canvass and knowledge of the territory. The scheme of the construction of the distribution system would be first to cover the territory already built up. The subsequent part of it would be the extension as the territory developed.

My judgment is that, while the immediate congested territory could readily be covered in a period of six years as assumed by Mr. Ryan, to reach out and cover all points in a system such as plaintiff's existing system and to develop the business (construction going on simultaneously with solicitation of business), would take very much longer than nine years. I should think that, if a company had to duplicate the plaintiff's plant, to get out of the way of present existing mains of other companies, the water mains, the
1017 high pressure water system and the various underground systems, it would require at least six years.

On cross-examination conducted by Mr. Searls, the witness testified as follows:

I am assuming that mains are in the ground now as they are, and that the system to be constructed is a duplication of the existing system under present conditions of work. If no gas mains were there, if you could imagine such a possible condition, and no water mains, and these other things, it would take less time.

I made this estimate of time after Mr. Ryan's study was submitted to me, having in mind at the time the fact that it has taken the Pacific Gas & Electric Company and its predecessors perhaps forty years to build up the present business in San Francisco. The business was forty years growing because they did not know until recently how to use gas for other purposes than illumination.

Electricity has been in use for about 31 or 32 years as an effective illuminant, and for about twenty years as power. In making up my estimate of the period for developing business, I had in mind the public already served with the commodity under the conditions of service that would apply at the time that the plant was constructed, and when there was competition without the intensive knowledge of the use of gas in different ways. I assumed a management that

would make a very scientific study of that situation, and that
1018 would employ men versed in the knowledge of that business to educate the mass of consumers along lines that they had not been educated in before. In that connection and as indicating my frame of mind, we have only recently undertaken what we call our campaign in the sale of gas appliances to displace wood and coal ranges and gasoline stoves and gas engines. By bringing that intensive education to the people we have accomplished marvelous

results in educating them to that use of gas, and in displacing other kinds of fuel as well as means of lighting.

I assumed the existence of a competing company giving service to the city in which the new business was to be built up, basing my assumptions on Mr. Ryan's statement contained in Exhibit No. 46 in which he assumed a company in existence, a competing company coming in, a merger and a continuance of the business. My assumptions were based upon his assumption. The period of time that it would take to build up that business under those circumstances would to some extent depend upon the character of the competitor that you were displacing. Those assumptions conform closely to the actual history of the gas industry in San Francisco.

The San Francisco Gas and Electric Company prior to the entrance of the Metropolitan had practically an unlimited field. The Metropolitan Company came in just before the fire in 1905, and as all competing companies do, it occupied the congested part of the city, where the consumption per consumer was very much in excess of that of a company operating in the entire city. There was
1019 a merger subsequently of those two companies and then the driving ahead of business.

It is an obvious conclusion that it was a simpler matter for the large company to buy out the small one than for the small one to buy out the larger one. The length of time it would take to develop business under competitive conditions would necessarily depend upon the strength of your competitor and the character of the business he was carrying on and how strongly he was established and on the management.

1020 N. RANDALL ELLIS, a witness called for the defendants having qualified as a Valuation Engineer, testified in substance as follows:

At the request of Mr. Searls I gave some consideration to the element of going concern and development expense as applied to the properties of the Pacific Gas & Electric Company and incorporated that in the form of a study. In my final summation of the defendant's case and the determination of the rate of return earned by the ordinance in question, I have made no separate allowance for "going concern."

As explained in my opening testimony, the engineers in determining structural values did not attempt to reproduce the plant on a purely theoretical basis, or on the assumption that the entire plant would be built under the minimum prices which it might be possible to obtain under wholesale construction; we rather sought to apply to the existing plant the unit prices which the experience of the company over several years preceding June 30, 1914, had demonstrated to be reasonable in their actual construction as an operating utility. And in so doing I feel that we recognized to some extent the fact that the Company is a going concern.

All expenditures for acquisition of new business have been allowed in operating expenses, as have also the salaries of the executive officers.

I believe that where a company has sustained legitimate development expenses before it was placed on a paying basis, that such development expenses should be capitalized. I have not found such a condition in the plant under discussion, and the following outline of the history will serve as a basis for the conclusions which I reach.

Q. You say "legitimate development expenses before it was placed on a paying basis," do you make that statement irrespective of whether they were subsequently amortized or compensated?

A. No, I meant legitimate development expenses which were unamortized.

As to the method sometimes used of building up a going concern allowance under hypothetical conditions I believe that this procedure involves too many assumptions to be dependable. Realty values, reproduction costs of structures, the question of a fair rate of return, are all based upon conditions which include as an essential element the existence in San Francisco today of the identical plant which we are valuing. Whether or not the city would have the same population, the same demand for gas, the same realty values, the same rate of return for money if this were a community not served by a gas plant and with a population uneducated to the use of gas, is far too speculative in my opinion to admit of a satisfactory answer.

Development expense: The San Francisco Gas Company was incorporated August 31, 1852, and shortly thereafter commenced construction. The first gas lighting in San Francisco was on February 11, 1854. The construction of the plant was carried on throughout 1854, and the annual report for the year 1854, as spread on the minutes, shows a total cost of works to December 31, 1854, as approximately \$441,711.00 and that the profit for the year 1854 was approximately \$77,000.00.

The stockholders meeting of February 1, 1855, showed that \$285,000.00 had been paid in to date by stockholders and that the liabilities of the company were \$200,000.00.

The capital stock which was originally 1,500 shares of a par value of \$100.00, or \$150,000.00 was increased on December 14, 1853, to 4,500 shares at a par value of \$100.00 or \$450,000.00 and on February 1, 1855, to 10,000 shares at \$100.00 par value or \$1,000,000.00.

The annual report for the year 1855 was presented at the stockholders meeting of January 7, 1856, and showed the following:

Plant Account, Dec. 31, 1855.

Real Estate	\$47,077	
Construction	399,351	
Pipe, lamps and posts	86,483	
Meters and services	21,976	
		\$554,888
Contributed by original Stockholders		352,395
		<hr/>
Cost over assessments		202,493

Q. These figures were taken from what source?

A. These figures were taken from Minute Book No. 11 of the San Francisco Gas Company.

At this date the plant is stated as being free from debt.

1023 The first dividend of \$10,000.00 was declared Nov. 3, 1855, and total dividends for 1855 amounted to \$30,000.

The annual report shows the following statistics as of Dec. 31, 1855.

11 miles of pipe

563 consumers

378 street lamps.

Capacity of plant 275,000 cubic feet per day—and, as it is stated in the report, "sufficient for some years to come."

The report also develops that the profits for the year amounted to \$220,678.00 and that the total receipts were \$353,620.00.

During 1856 the average daily consumption was 89,380 cubic feet, or a total of 32,623,790 cubic feet for the year.

The quarterly report for the thirteen weeks ending Oct. 9, 1856, showed:

Cash receipts	\$52,494
Net Profits	38,723
Average profit per week	2,978

The total dividends paid during 1856 amounted to \$130,000.

Subsequent to 1856 there is little information in the minutes bearing on the revenues and expenses of the Company. The last entry in the only existing minute book of the San Francisco Gas Co. is under date of January 20, 1862.

Dividends: From the Statistical Record the following data is taken as to dividends declared:

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1855	\$30,000
1856	130,000
1857	40,000
1858	112,500
1859	120,000
1860	120,000
1861	120,000
1862	170,000
1863	180,000
1864	235,000
1865	240,000
1866	280,000
1867	360,000
1868	360,000
1869	405,000
1870	540,000
1871	540,000
1872	345,000
1873	410,000

Interest Rates: The minutes show the following: Dec. 14, 1853, during progress of construction The Company paid 3% per month on an \$11,000 loan. In August and September 1856, the Company borrowed money on short time loans at 2% per month (loans for 90 days and five months).

1025 In 1859 the Company set up an "Improvement Fund" of \$70,000 which was to be loaned out at 1¼ per cent per month.

Increase of Capitalization: The capital stock was increased in 1862 to 60,000 shares at \$100.00 par value or \$6,000,000.00; there were no material increases in the plant up to that date, as the first recorded change is from the iron retorts to clay retorts in 1863; (see Ex. 78) and a study of the probable development of gas consumption indicates that the original installation of 275,000 cubic feet daily capacity was ample until the change to clay retorts.

Q. Are you referring now to the manufacturing plant or to the distribution system?

A. I am referring specifically to the manufacturing plant at that point.

Q. You do not mean to say there was no considerable expenditure in the distribution system?

A. No. In that sentence I say, "and a study of the probable development of gas consumption indicates that the original installation of 275,000 cubic feet daily capacity was ample until the change to clay retorts." I made tentative figures of the probable increase of the distribution system, interpolating between two limits of known length of pipe, and it indicated the normal development of the distribution system with a possible mileage in 1862 of somewhere between 32 and 35 miles, as I recall it.

Q. But that is only a matter of inference; you don't know
1026 anything about that from any authentic information?

A. Not specifically. It was interpolated between known lengths of pipe in 1855 and known lengths of pipe in 1876, I believe it was, and considering those with the development of the population and the development of the sales of gas.

The estimated value of these clay retorts and accessories together with those added in 1868, is \$300,000.00 see (Ex. 78).

In 1868 the Citizens Gas Co. was purchased; the equipment exclusive of buildings and holders is estimated in Exhibit 78 as \$300,000; that is taken from Mr. Jones' affidavit.

No further increases of plant are recorded until the merger in 1873.

After considering the above data as to dividends, investment and plant development, I am of the opinion that there were no early losses suffered in the development of the gas industry—I mean that there were not subsequently amortized, and that on the contrary the San Francisco Gas Company during its existence had a very profitable business.

The bulk of the figures presented during the period from 1873 to 1897 are taken from a Statistical Record, the original and supporting books of account covering the subject are not available.

This record shows an opening entry of the valuation of the various physical properties April 1, 1873, as follows:

Real Estate.....	\$1,325,000
Construction	2,141,176
Street Mains.....	1,175,916
1027	
Services	217,232
Lamps and Posts.....	82,495
Meters	178,722
Total	<u>\$5,120,544</u>

I have examined all data available on the subject and am convinced that this opening entry does not represent investment, but was simply a bookkeeping entry at the inception of the San Francisco Gas Light Company, and its basis may have been the market value of the securities at the time, or an inflated appraisal.

Referring specifically to the items:

Real Estate: The following table is a compilation of such information as I could obtain on this subject. It shows first that the assessment roll of 1874 is much below the claimed value of real estate; second that the assessment roll of 1874 is higher than in subsequent years and in some cases is not materially less than the price obtained for the property many years later; third, that when the original cost of the realty was obtainable, the assessment roll is far in excess of such cost. I conclude from these figures that the value of \$1,325,000 placed on real estate is a sum very much greater than the original investment.

Real Estate—Tabulation of Original Cost, Assessed Values, and Sales.

	Original cost.	Date purchased.	Authority.	1874-5 assessed value.	1885 assessed value.	1895 assessed value.	Sold for.	Date sold.	Authority.
Block bounded by First, Fremont, Howard and Natoma.	22,500 13,500	Dec. 14/1853 May 2/1854	Min. Book "	83,700	80,785	80,410	85,325	1896-7	Ledger and Minute Book S. F. G. L. Co.
Property on S. side of Howard West of Fremont.	36,000 (a)		" " 1/19 and 4/5/1859.	21,400	18,305	23,850	27,000	1896	
Property in block bounded by Fremont Beale, Howard and Natoma.	(b)		Min. Book, 7/21/1855.	77,100	81,040	83,520	86,050	1896-7	
100 vara lot Howard and 5th...	22,000	July 26/1860	Min. Book	95,000	60,750	75,000	in use		S. F. Gas Co. Min. Book P. 292.
2 lots 5th and Tehama.....	.....	.....	.....	4,750	3,180	3,640	in use	
King St. Property Originally	.....	.....	.....	170,550	131,150	203,160	304,500	
Citizens Gas Co.	.....	.....	.....	76,000	sold			
Old Metropolitan property Bryant and 10th.	.....	.....	.....	17,350	26,500	51,810	in use	May 1/1903.
Potrero Property.....						
				\$545,850	401,710	521,390			

(a) This property purchased in 1859 apparently for sum of \$11,900.

(b) These lots in this place, purchased 7/21/1855 for \$7,000. Assessed 1874-5 30,200.

NOTE.—If from the claimed valuation in 1873, \$1,325,000, there be deducted the properties whose original cost is known, amounting to \$75,900, and the remaining \$1,148,100 be distributed among the remaining properties in the same ratio as their assessment in 1874-5, we would obtain a value for the King St. property of \$620,000, and for the property bounded by Fremont and Beale of \$172,000; in each instance an amount about twice as great as was secured from the sale of these properties many years later.

1029 I would indicate more specifically than in this table set forth that the block bounded by Fremont, Howard, First and Natoma, which was the main site of the San Francisco Gas Company, was purchased for the sum of \$36,000; its assessed value in 1874-5 was \$83,700.00; it was sold in 1896-97 for \$85,325.00. Another purchase on which we have specific information is the 100 vara lot at Howard and Fifth. This was purchased for \$22,000 in 1860; its assessed value in 1874-5 was \$95,000.00; it is still in use. It will be noted that in the case of the Howard and Fifth Street property particularly, and also in the case of the First & Howard Street property that I have referred to, that the 1874-5 assessment seems to be much higher than the 1885 assessment, ten years later. I also made a calculation on the basis that if we assumed that the valuation placed on real estate was \$1,325,000 and from that deduct the known costs of real estate and apportion the balance over the remaining properties in the same ratio as they were assessed, it would give a value for the King Street property of approximately \$620,000.00 and for the property at Fremont and Beale \$172,000.00 as compared with the sale of the King Street property in 1903 at \$304,000 and of the Fremont and Beale Street property at \$86,000.00. A consideration of all of these facts leads me to believe that the real estate appraisal did not represent investment.

My criticism is directed to the argument that was brought forth by the other side, that the opening entry very probably represented actual investment. I have not attempted to consider any appraisal

1030 of the property in 1873 as I had no basis for considering it. My tabulation shows that if we took out the original cost of certain of the properties and pro rated the balance between the remaining properties on the same basis as they were assessed in 1874-5 it would give a result far in excess of any value obtained from these properties 20 to 25 years later.

The relative population of San Francisco increased in the late seventies; up into the early nineties it was not on the same basis as the increase prior to 1870 or possibly prior to 1873. My impression is that considering population as it is very often considered, in terms of a compounding, that is, a percentage which applies to previous years' population, from 1860 to 1870 the rate of increase was about 10%, not meaning that during those ten years the population increased 100% as it increased very much more than that. The population's increase between 1870 and 1890 was only about on a compounding of 3½%. The rate of increase was not nearly as rapid as in the prior period.

Construction: Which refers to the plants proper and holders.

In the first place this undoubtedly includes the old Metropolitan plant, which was, from such information as we have, an unsuccessful experiment in making gas from crude petroleum; it was apparently purchased by the San Francisco Gas Co. to exclude a competitor; the charter of the Metropolitan fixed a maximum price of \$3.50 per M on gas at a time when the San Francisco Gas Co. was selling at \$4.50 per M.

1031 The other plants which entered into the consolidation of 1873 were:

Plant at Potrero (City Gas Co.).

First and Howard Street Plant (original San Francisco Gas Co.).

King Street Plant (original Citizens Gas Co.).

In Exhibit 78 the equipment of the King Street and 1st and Howard Street Plants is estimated at \$600,000.00 not including the iron retorts previously abandoned.

This estimate does not include the buildings or holders.

Buildings and holders at the 1st and Howard Street plant have been estimated by Mr. Jones at \$150,000.00 in figures furnished to us, although he stated that this was probably low; if we add a similar amount for the King Street buildings and holders, we would have a total of \$900,000 for these two plants. As to how much was represented by investment in plant at the Potrero I have no means of knowing. The City Gas Co., the holder of this plant, was incorporated for \$1,500,000; they started operating in 1872 and were absorbed in 1873; as to how much of their capitalization had been expended at the time of the merger, it is impossible to determine.

Mains: I estimate that there were probably 170 miles of mains in 1873 at the time of the merger; this is based on known mileage in 1877. The valuation of the mains is placed at \$1,175,916 or approximately \$7,000 per mile; the original cost of the first

1032 11 miles of mains, including lamps and posts, was at December 31, 1856, \$86,483.00, or \$7,862.00 per mile, this including the main feeder from the plant and reflecting the high cost of labor and material at that period. The $4\frac{1}{2}$ miles of mains built during 1855 averaged \$4,950.00 per mile, including lamps and posts.

From 1877 to 1887 the mileage of mains increased sixty miles, and the Statistical Record shows an increase in the capital account for mains of \$220,556.00, or \$3,676.00 per mile.

Wages and material both had a marked decline during the period between 1856 and 1873.

In view of the above, I am of the opinion that the value of mains as shown is in excess of the investment.

From such information as I could get on the remaining items of meters, services and lamps and posts, they do not seem to be unreasonably inflated.

In conclusion, as to the opening entry of April 1, 1873 it seems obvious to me that it is much in excess of actual investment.

I further believe that the consolidation in 1873 resulted in a plant capacity considerably in excess of the normal requirements for San Francisco. Apparently no additions of consequence were made until 1885, twelve years later. The gas send-out for the year 1874 averaged 1,320,000 c. f. per day, or a total for the year of 468,402,000 c. f.

In 1883, prior to the next addition to the plant, the send-out averaged 1,750,000 c. f. per day, or a total for the year of
1033 639,356,000 c. f.

With an average daily output in 1874 of 1,320,000 c. f. the average plant capacities, based on figures furnished me by Mr. E. C. Jones, approximated 3,400,000 c. f. per day.

With reference to the data set forth in the Statistical Record, bearing on revenue, expense, capital, etc., I have examined this record and believe that it is not dependable as a basis for determining net earnings. While it may be, as it purports to be, a transcript of summaries from the regular books of record, in the absence of such books of record there is no means of telling whether the detailed charges under the various captions were proper or not. We were only able to find underlying records in one instance, to wit, Tax Registers, and here there was a serious discrepancy between the original record and the figures shown on the Statistical Record.

Another instance was developed in the case of transfers or credits to certain construction accounts, shown in Exhibit 58, Sheet 15, under "Decrease in Plant"; the plaintiff contends that these "decreases" represent write-off of capital, in the same category as depreciation; from a study of the figures, to me it seems perfectly obvious that these were not write-offs of plant but simply transfers from a special construction account to a general construction account on the completion of a particular job. My reasons for this conclusion are the identity between the total costs of particular jobs and the amounts indicated as "decrease"; further the fact that the construction account at the time of such "decrease" appears to be proportionately increased; also an examination of the accounts

1034 of the Company in 1906 where the original books are existent, shows that in closing out the North Beach Construction the procedure was to credit "North Beach Construction" and charge the "General Construction" with the amount of the account.

I believe this all goes to show that the "Statistical Record" is in itself not a dependable basis for drawing deductions as to possible net returns during the period it covers. I have quoted from this Record in the matter of dividends paid between 1855 and 1873, as I believe that on an account such as "Dividends" there is little likelihood of misinterpretation, and the memorandum covering these and subsequent dividends is probably correct.

On this matter of the accountancy practice during the period prior to 1902, President Bourn in his annual report to the stockholders for the year 1902 states:

"Since the organization of your company the accounting systems have not been uniform, statements or comparisons are of little value unless the method of accounting is understood."

I believe that such a statement from the President in 1902, when all the old records were available, indicates that even at that time it was difficult to draw satisfactory comparisons without a considerable study of the underlying records.

My investigation of the available records seems to indicate that the company did not write down their assets when plants were

1035 abandoned. This is particularly noticeable in the case of the works at First and Howard and the King Street works which were abandoned in 1891; although the King Street works had been shut down prior to that date; there is no indication in the capital account that there was any reduction due to the abandonment of these plants.

In the President's report for 1903, he states, "Savings through efficiency were effected and operating expenses so reduced that notwithstanding two years' warfare and greatly disturbed conditions, your company prospered far beyond its rivals, made large earnings, and is now placed on what can be made a thoroughly sound foundation."

My conclusions from the foregoing are, first, that the original San Francisco Gas Co. suffered no unamortized development expense, but on the contrary was very profitable. Second, that the essential books of record in the period between 1873 and 1906 are in the main destroyed and such available data is not sufficiently complete to determine the actual profits made during the period; although the President's report quoted above seems to indicate that in 1903 the business was in a satisfactory condition.

In the period subsequent to 1906, rates were in force acceptable to the Company, and in the particular years in controversy our final summation indicates that the ordinance rates yielded a substantial return on the fair value of the property.

It therefore appears that there is nothing to justify the addition to the value of the properties during the years in litigation of any amount representing original development expense not long since compensated by rates in excess of those necessary to yield a fair return.

1036 Q. There is one question in connection with the going concern matter, Mr. Ellis, that I might ask you. It has sometimes been stated that the experience of the purchase and sale of public utilities shows that a margin over the reproduction value has been paid, which has been ascribed to the fact that the business was a going concern; if in the State of California, as I think it may be developed on the argument, the Railroad Commission has made a practice of refusing to allow a separate increment for going concern value in the valuation of plants and has confined itself to providing that original deficits may be added where they have not been compensated, what effect do you think such a ruling would have on the propensity of purchasers to pay a separate allowance for going concern in this state, irrespective of whether the commission was right or wrong in its contention?

A. As I understand you, would the purchaser pay probably an amount over and above the physical valuation of the property for an element of going concern under the conditions you cite—is that the question?

Q. Yes.

A. My opinion on the subject would be that he probably would not, since he would not, under your promise, be permitted to earn a rate of return on such payment for going concern.

Mr. Bosley:

Q. You might take it one step further, Mr. Ellis; supposing the railroad commission would not allow any return on more
1037 than 50% of the physical assets, do you suppose the physical assets would sell for more than 50% of what it cost to put them in?

A. I do not think anyone would buy the plant; I do not think you would have a purchaser.

Mr. Searls:

Q. What do you think would be the effect if it were known that the federal court had ruled that going concern should be included as a matter of fact in rate cases, and that that matter was still in litigation?

A. It would depend on how far the prospective purchaser would want to buy a lawsuit.

On cross-examination the witness testified in substance as follows:

My opinion is that interest on the cost of the plant during the period of construction should properly be added to investment in the plant for the purpose of obtaining the value of the plant at the time it is ready to begin operations. I believe that development cost ought to be capitalized; that the cost of development during the period from the time when the operations are started until the time when the property is on a paying basis should be capitalized; and that, if there is no opportunity of amortizing the cost of development in the immediate future, then such cost should be added to the capital account.

1038 Interest on investment from the completion of construction to the time when the business is developed to a paying point could be treated, if there were no opportunity of amortizing it, either as a special item in determining reproduction value or as a part of the cost of developing business or it could be carried as an item to be amortized. The cost of development of the business, which would include interest on capital, could not properly be added to reproduction value of your physical property. It would undoubtedly be carried under some specific heading.

I recognize that there is such a thing as the cost of development of the business, which is separate and distinct from the mere cost of constructing the plant and putting it in readiness for operation. The history of such a plant as the plaintiff's gas works in San Francisco shows that they start with a small plant and gradually make additions and extensions. It is naturally a progressive development. You usually build your plant in anticipation of further development.

Speaking specifically of gas plants, you would not put in a far over-built plant, nor on the other hand would you put in a plant just sufficient to take care of the immediate needs of the vicinity. There is some latitude in that respect. The cost of construction is

1039 in accordance with, in the case of the old plants, the number of coal gas benches, and, in the case of the later plants, the number of oil gas generators installed from time to time.

In the construction of a plant, the amount of the investment is not the only thing to be considered. One should also consider economy of operation. It is true in the case of a plant which is built up by successive additions of substantial units that you will repeat your initial processes, that is, you will build units and put them in readiness for operation in advance of the demand and then develop the business.

Suppose we had a gas plant erected with two gas generators having a total capacity of 10,000,000 cubic feet a day which was sufficient under existing conditions to supply the demand and to provide for the immediate future. Under the present system of regulation the tendency would be to fix a rate which would afford reasonable compensation for the use of the capital already invested.

If, in the course of time, the demand for gas should increase so that the two generators would hardly be sufficient and, if it should reasonably be anticipated that, by the time another gas generator could be erected, the demand for gas would equal or exceed the supply that the two original generators would be able to furnish, and, if upon a consideration of the entire subject it should appear that it would be most economical to erect another unit having a capacity of 5,000,000 cubic feet per day, it might be advisable to erect a unit of that capacity. But the demand for gas would

1040 not immediately be increased by 50%, it would take time to develop the business. Upon these hypotheses, if rates had been fixed previously on the basis of affording a return on the amount of capital then invested and should not be increased, the owner of the plant would probably not make a sufficient return upon his additional investment until the demand should increase. During the period required for the growth of the demand, there would be some additional cost of developing the business. But I can hardly see how such conditions could occur, for in ordinary rate fixing, or in ordinary business development, all extensions and all reasonable development costs are taken care of in the rating base. All contemplated construction for a certain period and reserve machinery, whether it is working to capacity or not, is included in the basis on which a rate is to be fixed. Speaking of development expense being capitalized, my interpretation is this; That from the inception of an industry to the time it goes on a paying basis the company should be permitted to recoup any of the unavoidable losses. After it goes on a paying basis individual losses or fluctuations from year to year should not be capitalized as part of the business. If I were sitting as a rate fixer, I think that I would permit a sufficient rate over a long enough period to take care of any fluctuations due to these additional investments. In other words, instead of raising

1041 the rate to its maximum in any one year, the increase would be spread out over five years.

The object of making additional investments in plants from time

to time is to take care of additional consumers or an increased demand on the part of the existing consumers. As a matter of fact, in the development of any business, there is always a lag between the time when the investment is made and the plant is in readiness for operation and the time when sufficient business is developed to enable you to operate the plant to full capacity. That lag manifests itself at the beginning when you erect the first unit of your plant. It is obvious that there is always a lag between the time when a new unit is added to an operating system and the time when that unit reaches its full operating capacity. In other words, you are never working your plant to its maximum capacity to supply consumers. There is always a margin. Every time a new unit is installed the supply is raised above the demand. If the rates you are receiving for gas have been trimmed to such a minimum as to allow no fluctuation and you have got to meet these additional expenditures without any increase in such a minimum rate, you are entitled to recoup at some place.

In developing a business in a growing community you always have to keep ahead of the demand whether your rates are sufficient to protect you or not.

The process involved each time a substantial unit is added to your plant is the same as the process at the beginning of operation, 1042 if conditions are the same. At the start you have no possibility of recouping a possible difference between cost of operation and revenue. After you have started, if the rates are not sufficient to afford compensation, you may have recourse to the courts. If there were a necessity for additions to a plant so as to give service, and if the rates did not afford a return on the existing property and also on the additions, I would say it was incumbent upon all the consumers to stand an increase in the rates, as it is more or less of a mutual affair. The additions would be made either to provide for an increase in the quality of service or to provide for new business. Gas and water rates are not based on the cost of individual consumers, but on the general spreading over the community.

I consider the investment in new plant as all capital investment. The capital is to be furnished by the public utility and not by the consumer. The consumer should pay a return on the capital. He pays for the service which he receives. The development of a business in a growing community is a continuous process, and involves continuous effort on the part of the owner to induce consumers to avail themselves of the service which he furnishes.

1043 Mr. L. P. LOWE, a witness called for defendants, having qualified as a gas engineer and expert in the erection, operation and management of gas properties, testified in substance as follows:

The cost of developing a business does not appear to me to be a loss. A business must be developed and worked up, all of which costs money. In the early stages, it costs a great deal more to develop a business than you can possibly get out of a rate. To that extent such costs must be capitalized, although that particular capital

may be later amortized. At some stage of the history of the company development costs must be capitalized.

In view of the attitude of the California Railroad Commission, it is difficult to answer the question whether, in valuing a gas plant, the value of the existing business should be ascertained from its history or by estimating the cost of reproducing it on assumed hypotheses. I cannot rid my mind of the influence exerted upon it by the rulings of the Railroad Commission which has taken the position that development costs should be amortized out of earnings when the latter are sufficient and may not thereafter be treated as part of the invested capital.

I believe that development cost should always be capitalized. If you can determine the cost historically that settles it. On the other hand, if you cannot, if the records of the company have been lost or destroyed, then the best you can do is to make some estimate of the cost of developing the business based on the history of other plants.

I do not wish to be misunderstood. If I were building gas works in California and if it should cost me a certain sum of money to develop my business, I would arrange for the amortization of the cost of development. But I would do so only because the Railroad Commission refuses to allow cost of development in capitalization.

After a company's business is once established, the cost of developing that business is presumed to be included in the current rate. If, however, the cost of developing the business has been very great, much beyond the normal, then I think it would be fair to capitalize a certain amount of that cost.

In the past history of the gas business, we have always felt that we were entitled to some value for what we called our going business, going concern; but the Railroad Commission has said that we are not—I don't think that is quite true. The Railroad Commission says that this element has been considered and allowance made for it, but as a matter of fact it allows nothing. That is the truth of the situation. My opinion as to what allowance should be made for going concern is necessarily swayed by what the Railroad Commission has said.

It is unfortunately the case that a gas company can charge only such rates as are fixed by the Railroad Commission on the basis of its valuation of its property. Anybody who would purchase property on any other basis than the valuation fixed by the Railroad Commission would make a great mistake. Even if I should be advised that, by taking the matter into court, I could establish a right to earnings based on the reproduction value of physical property plus going concern, I would not, as a practical matter, think that I would be justified in adding anything for the hypothetical going concern value. The only safe basis today on which one may consider the purchase of such a property is the value of its physical assets. It has cost me considerable money to seek to reverse the decisions of the Railroad Commission by a suit in court and so far I have not met with success.

If in 1913 or 1914 I had been employed as an engineer to examine

property and also as an expert in the development of the business, I would have advised the payment of a reasonable amount for the value of the business. Today, I would not do so because of the attitude of the Railroad Commission.

On cross-examination, the witness testified in substance as follows:

If the Railroad Commission should adopt and put into effect a rule that, in rate regulation proceedings, it would allow, over and above the cost of operation, only a reasonable rate of return upon sixty per cent. of the reproduction value of physical assets, I would advise a prospective purchaser to have nothing to do with gas property.

1046 If the Railroad Commission should adopt a rule that it would allow a reasonable rate of return only on ninety per cent of the reproduction cost of the physical properties constituting a gas manufacturing plant and distribution system, I would advise my client not to pay a penny for that property either, because it would appear to me to be flat confiscation. I could not advise my client to invest any money in a community where that could be done. I mean that, if it had been proven and admitted that a property was worth one million dollars and the Railroad Commission should say you can earn on only \$900,000.00, then I would say I want no more of this state.

On redirect examination, the witness testified in substance as follows:

The cost of developing business is not a loss, but properly a part of the original capital investment. If a company has not voluntarily amortized the cost of developing its business and has always carried it as a capital account, it should be allowed to continue to carry it that way, unless it is ordered to amortize it and actually amortizes it. That, however, has nothing to do with reproduction of an established business after the company has been in operation for a great many years.

For instance, the cost of developing the gas business in San Francisco when the gas works were first installed was probably a
1047 very small item. The cost of reproducing the gas business in San Francisco today, if there were no gas works here, and if it had to be developed with present facilities within a reasonably short time, would probably be several million dollars. The cost of developing the business is usually carried in the operating expenses unless an extraordinary amount of capital is required. If development costs cannot be paid as operating expenses, they should be capitalized. If they are not to be allowed as capital charges, it should be permissible to amortize them out of the rates. I would not attempt to capitalize the cost of developing an existing business on the theory that there was no existing plant or that there were competing plants that had to be driven out of business.

N. B.—The Master's discussion of the value of the plaintiff's going concern or established business is contained in his report on pages 87 to 95.

1048 F. Value of the Franchise of Using Public Streets as a Right-of-Way for Laying, Maintaining, and Operating Gas Mains and Service Pipes, Together with Necessary Connections for Supplying San Francisco and Its Inhabitants with Gas.

Mr. Bosley, counsel for the plaintiff, having first directed the Master's attention to the fact already established by the evidence, that the plaintiff's gas manufacturing plants and gas distribution system in San Francisco had been constructed and were in operation long before October 10th, 1911, requested the Master to take judicial notice of the provisions of Section 19 of Article XI of the Constitution of California, as that section existed prior to its amendment on the last-mentioned date. A true copy of said Section 19 of Article XI of the Constitution of California as the same existed prior to its amendment on October 10, 1911, is as follows:

Sec. 19.—“In any city where there are no public works owned and controlled by the municipality for supplying the same with water or artificial light, any individual, or any company duly incorporated for such purpose under and by authority of the laws of this State, shall, under the direction of the superintendent of streets, or other officer in control thereof, and under such general regulations as the municipality may prescribe for damages and indemnity for damages, have the privilege of using the public streets and thoroughfares thereof, and of laying down pipes and conduits therein, and connections therewith, so far as may be necessary for introducing into and supplying such city and its inhabitants either with gas light or other illuminating light, or with fresh water for domestic and all other purposes, upon the condition that the municipal government shall have the right to regulate the charges thereof.”

1049 Mr. E. C. JONES, recalled as a witness for the plaintiff, having previously qualified as a gas engineer by profession and an expert in the construction and operation of gas manufacturing plants and distribution systems, testified in substance as follows:

I have carefully considered how wide a strip of land would be required as a private right-of-way for the construction, maintenance and use of the plaintiff's gas mains, electric conduits and electric transmission and distribution lines in the City and County of San Francisco. For that purpose, a strip of land 10 feet wide would be required, and in my opinion would be adequate.

If a system of gas mains were to be laid in private rights-of-way, extending through the blocks of land in the City and County of San Francisco, it would be necessary, in order to give reasonably efficient gas service to all of the inhabitants of the said city and county, to have one gas main of adequate dimensions running lengthwise

through every block, and also to have feeding mains crossing the first-mentioned mains at right angles at an average interval of about six blocks.

I have made a study of the cost of constructing a gas distribution system such as I have indicated, in San Francisco, that is to say a system constructed in private rights-of-way through the center of each tier of blocks and other lines of mains crossing the first-mentioned lines at intervals of six blocks. I have computed the cost of

such a system and have compared the same with the cost of a 1050 gas distribution system laid in the public streets in the same manner as the plaintiff's present gas distribution system has been constructed. In making my study I have assumed that, for the construction of an ideal system of gas mains laid in the public streets, two mains in each street, one laid on each side, would be required in the more thickly populated parts of the city, and that only one main would be required in each street in the more sparsely settled districts.

In making this study, I have taken a typical section of San Francisco and have laid it out with a gas distribution system located in private rights-of-way, in the manner which I have already indicated. I have carefully measured the length of mains required and the cost of laying them. For purposes of comparison I have laid out the same area containing the same streets and designed a one-main street system for serving the same, that is to say, a system of mains of a diameter of 6 inches, laid in the public streets. I have also taken the same section and designed and laid out for the same a two-main street system, that is to say, a system consisting of two four-inch mains, one laid on each side of each street. I have calculated the cost of each of these street main systems. In making these calculations I have used the unit costs of labor and material which I employed in the preparation of my inventory and appraisalment (Exhibit No. 3 in this case). In making my estimate of the cost of the distribution system laid in private rights-of-way, I have assumed that there would be no costly paving over the mains, except 1051 at street crossings. I have assumed that the rights-of-way probably would be macadamized so as to make them usable.

According to my estimates, the cost of construction of an adequate gas distribution system of the character already indicated by me, in private rights-of-way for the service of the City and County of San Francisco, would be \$3,297,000 less than the cost of a two-main street system for the entire city, and \$2,495,000 less than the cost of a one-main street system for the entire city.

If we assume that the city would be about equally divided in two sections, one of which would require a two-main system and the other a one-main system, and compare the cost of the construction of the street main system with the cost of construction of a system laid in private rights-of-way, the cost of the latter would be \$2,896,000 less than the cost of the former. Roughly speaking, the saving to be effected by the construction of a gas distribution system in San Francisco, in private rights-of-way, as compared with the cost of a

gas distribution system laid in the public streets, would be approximately \$3,000,000.

In San Francisco at the present time, in approximately 50% of the public streets there are two gas mains or more, and in the rest one main.

For the purpose of my estimate of the cost of constructing a gas distribution system in private rights-of-way, I have assumed that the necessary rights-of-way through the blocks would be acquired before buildings were erected thereon.

1052 Private rights-of-way 10 feet in width, located as I have already indicated, would accommodate both a gas distribution system and an electric distribution system, and about one-half of such rights-of-way would be required for each system.

1053 Mr. E. B. HENLEY, recalled as a witness for the plaintiff, having previously qualified as an expert with reference to the value of land in the City and County of San Francisco, testified on direct examination in substance as follows:

I have made an estimate of the present value of a strip of land 10 feet in width running lengthwise through each tier of blocks in the City and County of San Francisco and another strip of the same width running crosswise through every sixth tier of blocks, except those parts of the city which are not served by the plaintiff's gas and electric distribution systems.

In the real estate world there are three recognized rules for the valuation of real estate which were originated by the larger trust and banking companies interested in loans on real estate situated in different portions of the country, and which are known as the Pleydell Rule, the Lindsey-Bernard Rule and the Sommers Rule. These rules were originated in order to give a basis for valuation of lots of different depths and for valuation of different parts of lots of different depths. These rules assign to each part of each lot of specified depth a definite percentage of its total value per front foot and cover lots ranging in depth from 100 to 200 feet. Many of the blocks in San Francisco are two 50 varas in width, that is to say, 275 feet, and there are others of varying sizes.

The Pleydell Rule allows .06 of the total value for the rear 25 feet of a 150-foot lot; and .1063 of the total value for the rear 25 feet of a 125-foot lot. The percentage is computed on the value of the land per front foot as a basis.

The Lindsey-Bernard Rule allows .05 of the entire value for the rear 25 feet of a 150-foot lot, and .0735 for the rear 25 feet of a 125-foot lot.

The Sommers Rule allows .0539 of the entire value for the rear 25 feet of a 150-foot lot and .0838 for the rear 25 feet of a 125-foot lot.

By adding these percentages and dividing the sum by three, we get an average as follows: .0556 of the entire value for the rear 25 feet of a 150-foot lot, and .0876 for the rear 25 feet of a 125-foot lot. In my judgment these rules are reasonable.

In valuing this 10-foot right-of-way described by Mr. Jones in his testimony I have employed these rules. These percentages that I last gave apply to the rear 25 feet. In order to get to a basis for valuing the rear 5 feet, I have divided these percentages by five and have arrived at the following percentages: .0109 of the entire value for the rear 5 feet of a 150-foot lot, and .0175 for the rear 5 feet of a 125-foot lot. I have taken these two percentages last given and divided the sum of them by two in order to get an average for the value of the rear 5 feet of a 150-foot lot and a 125-foot lot, and I find that to be .0142. I will use that percentage throughout.

1055 For the years 1913, 1914 and 1915, the average assessed value of real estate in San Francisco, excluding Spring Valley properties at Lake Merced, Sutro Forest, the cemeteries, and in general all lands not reached by the plaintiff's gas distributing system, was the sum of \$326,517,246.

The assessments, according to the assessor in San Francisco, were based on 60% of the market value. The total market value of the lands mentioned, from July 1913 to July 1, 1916, would be on that basis \$544,195,410. Taking the total market value as \$544,195,410 and applying the percentage previously given, .0142, we arrive at the figure of \$7,673,155. That would be the value of the 10-foot strip of land running through all the blocks one way. To get at the value of the strips 10 feet wide running through every sixth tier of blocks the other way I have added a value of one-sixth, Mr. Jones stating he would want a right-of-way every sixth block.

Adding the one-sixth to \$7,673,155, it gives a total value of \$8,952,014. Dividing this equally between gas and electricity, gives us \$4,476,000 as the value of the portion to be used by gas mains.

It is estimated by the assessor's office that there are 140,000 separate pieces of land in the City and County of San Francisco across which we would have to secure rights-of-way. In my experience since I have been with the Pacific Gas and Electric Company we have practically never been able to purchase rights-of-way for 1056 less than the market value of the strip of the land itself. In addition to this, severance damages are allowed when parcels of land are divided by the right-of-way.

Since 1907 I have had absolute charge of the acquisition of rights-of-way for the plaintiff company both in the city and in the country. I have been in the department since 1904. The cost of acquisition of rights-of-way, exclusive of the amount paid to land owners for the rights-of-way, is a very considerable amount.

Since 1912 the Pacific Gas and Electric Company has purchased approximately 186 miles of right-of-way. In securing these rights-of-way we have had a total of approximately 500 separate pieces. The cost of securing these rights-of-way, including surveys, searching titles, expenses and salaries of the right-of-way men, recording costs and notary's fees, has been as follows: First, on the Drum-Cordelia line, extending from a point in Nevada County to Cordelia, in Solano County, a distance of about 109 miles, the average cost was \$125.90 for each right-of-way delivered into the files of the Pacific Gas and Electric Company, exclusive of the purchase price paid to the owner;

second, on the Drum-Stockton line, extending from a point where it intersects the Drum-Cordelia line in Nevada County, and running to a point just east of Stockton, the average cost amounted to \$112.20 for each deed delivered into the files of the Pacific Gas and Electric Company, exclusive of the price paid to the owner of the easement itself.

1057 The expense of acquiring rights-of-way in San Francisco would probably be less, due to the fact that the right-of-way men could see more people during the day, and that traveling and incidental expenses would be less. In my judgment the cost could be reduced to a minimum of \$50.00 for each owner. Assuming that you would have to deal separately with the owners of 100,000 separate parcels, that would make the cost of acquisition \$5,000,000, in addition to any amount paid for the rights-of-way themselves. The fact that the strip of land might be of some value to property owners as an alley would just about offset the cost of acquisition. Disregarding this fact, however, the cost of acquisition would be an amount equal to the market value of the strip of land itself.

I think that \$8,952,014 is the minimum price at which the total right-of-way could be secured.

On cross-examination the witness testified in substance as follows:

The computation given does not take into consideration the crossing of streets where the right could not be acquired from the private owner.

My real estate experience in San Francisco has been only in connection with the Pacific Gas and Electric Company.

I should say that there have been some fifteen private rights-of-way purchased here in San Francisco.

1058 Mr. MURRAY F. VANDALL, a witness called for the plaintiff, testified in substance as follows:

I am 43 years of age and have resided in San Francisco all my life. My business career commenced in 1890 and since that time I have been concerned with the real estate business almost continuously. I was in the office of Mr. W. S. Goodfellow, attorney for the German Savings & Loan Society, from July 1, 1890 to April 1, 1906, and had charge, after 1896, of the work of reporting on land titles in connection with loans made by the German Savings & Loan Society.

While employed by Mr. Goodfellow, I had an opportunity to ascertain the amounts of loans made on real estate mortgages in the City and County of San Francisco and also acquired knowledge of the market values of lands in San Francisco during that period. From time to time I was employed to make appraisements of lands in the city and was interested in the M. Fischer Company which dealt largely in San Francisco lands.

From the time of its incorporation in 1905 up to the time of the fire, in April, 1906, the M. Fischer Company was probably one of

the largest operating concerns in San Francisco speculating in lands and buying properties for the purpose of improving and selling them. That company operated in all parts of San Francisco. I was Secretary of the M. Fischer Company and managed its office. Before any lands were purchased by that company, I was consulted with reference to their value and the price which the company would pay for them.

1059 Ever since May 1, 1912, I have been the manager of the California Pacific Title Insurance Company. From 1906 to 1912, I was manager of the Pacific Title Insurance Company. Ever since 1906, I have had much to do in connection with reporting on titles, closing sales, closing mortgages, loans and things of that sort. In the course of my occupation I have acquired knowledge of the prices at which lands have been sold. Since 1906 we have handled more than 40,000 transactions involving the sale of lands, but it would be hard for me to say how many I have come in contact with personally. Of course, every day several transactions come under my personal observation.

During the period since 1906, I have had occasion to appraise properties for persons contemplating their purchase or sale, or contemplating the making of loans secured by mortgages upon the properties. The number of my appraisements would probably run up into the thousands.

In transactions involving the sale of lands, it is necessary to examine the tax receipts for the purpose of prorating taxes; consequently I have acquired personal knowledge of the assessed values of the lands that were the subject matter of the transactions which have come under my personal observation. I have not worked under the City and County Assessor at any time. I think I am sufficiently familiar with values of real estate in all sections of San Francisco to be able to compare the assessed value with the real market value. I am not prepared to state the market value

1060 of land in any section of the city from my own personal knowledge without investigation. I probably cannot state at the present moment the approximate selling prices of acreage land in the remote sections. There is a considerable difference in selling prices of lands in each section, depending upon the location of the property. I am not prepared off-hand to give anything more than the minimum and maximum limits of prices which are paid for lands in the various sections.

In cases that have come under my observation the assessed value of land as it appears on the books of the assessor is less than the market value.

A fair and conservative conclusion would be that the assessed value of land in San Francisco is about 60% of its actual or market value. I have had opportunity to compare assessed values with market values of land in all sections of San Francisco except some of the remote properties.

On cross-examination the witness testified as follows:

If I were called upon to give an estimate of the value of a particular lot in the 50 vara section or the Western Addition of San Francisco, I would not necessarily have to look at the assessment rolls before giving an estimate. In some parts of the 50 vara section I would rely upon my general information and my knowledge of prices paid.

If called upon to make a separate appraisal of any particular lot, I would examine the assessed value, but I should rely upon my own judgment, and as a general rule pay very little attention to 1061 the assessed value.

In closing real estate deals we are not much concerned with the relation the assessed value bears to the purchase price. I should say that the ratio between the assessed value and the actual sale value of 60 to 100 applies more closely to the Western Addition, 50 vara, 100 vara, Beach and Water survey, the Mission district and Horner's addition, these being the older sections of town, whether the property is improved or unimproved, than it does in other districts. In the unsettled portions of town there is no such rule as I understand it. The ratio sometimes goes down to 25%. The purchaser, who is contemplating buying the particular property in the 50 vara section, usually asks about the assessed value of the property and as to the amount of taxes, probably with reference to the expense of owning the property.

1062 Mr. A. F. HOCKENBEAMER, a witness recalled for the plaintiff, having previously qualified as an expert in financial matters, and particularly with reference to the finances of the plaintiff, testified in substance as follows:

In my experience in banking and public utility business, I have had occasion to consider the importance of term franchises and perpetual franchises and their relation to the value of public utility properties and business taken as a whole.

In the three or four years during which I was employed by the banking house of N. W. Halsey & Co. in New York, I had occasion to participate in the investigation of the affairs of a number of public utilities, such as gas, electric and street railway companies which had brought their bonds to us for purchase, or which had asked us to finance them.

We always regarded the franchise question as one of the vital things to be considered, fully as important as the earning power of the property. In other words, the property might be showing large earnings, earnings in excess of bond interest and dividends, but if the franchise situation was not satisfactory we would not touch the securities at all. What I mean by a satisfactory franchise situation is one in which the principal franchise extends well beyond the life of the bonds. Minor franchises were of less importance. But we always insisted that the principal franchise had to extend well 1063 beyond the life of the bonds, and that, of course, was aside from other questions in connection with the franchises.

We always satisfied ourselves that the franchises contained no burdensome restrictions; and, while I do not remember the names of the companies, I have a general recollection that in several instances we required the company applying to us for capital to actually obtain a renewal of their principal franchises which would run them well beyond the life of the bonds which they proposed to issue. In addition to that, we sought to protect the investor by a sinking fund provision in the mortgages securing the bonds, which would result in retiring a large percentage of the bonds by the time the mortgage matured, and also by allowing bonds to be issued for only a certain percentage of the value of the additional properties that might be constructed or acquired. Those provisions were designed to protect the investor against danger from a franchise which might expire.

If the franchise is really the foundation of the business or of the right to do business, and if it should terminate before the bonds mature, the investor in the bonds might find himself with a large proportion of the value of the property destroyed. The situation is a good deal like one where bonds are secured by a mortgage on a building erected on leased property when the lease provides that improvements shall become the property of the lessor at the end of the term.

A perpetual franchise insures the continuance of the business and the right to keep the property used in its exercise in public service in perpetuity, and consequently obviates the danger, incident to term franchises, that the value of the property constructed in public streets may be destroyed by the termination of the franchise.

Supposing the franchise of using the streets for the purpose of laying a gas distribution system was limited to fifty years and the legislative act granting it contained no provision obligating the public either to renew the franchise at the expiration of fifty years or, in lieu of renewing the franchise, to purchase the system at its then value, it appears to me to be obvious that the owner of such a property, at the expiration of the franchise under the conditions mentioned, would find himself with the larger part of his property merely scrap, used property which could not be operated, and which would have to be sold for its junk value. The owner of the property constructed under the authority of such a franchise would, in order to fully protect his investment, have to take enough from the earnings before the franchise expired to create a fund that would offset the destruction in value which would take place on the expiration of the franchise; in other words, it might be necessary for the owner to amortize his entire capital investment, in addition to making reasonable earnings on the investment during the time it was in use.

Perpetual franchises certainly have advantages over term franchises. I know, from our negotiations with the bankers who have purchased our securities during the last ten years, that they regarded the perpetual franchises, which the plaintiff possesses in this municipality, as having great value and my judgment is the same as theirs.

Comparing a perpetual franchise or right to construct and maintain gas mains in the public highways with a private right-of-way of a perpetual character by means of which the same service might be rendered (ignoring questions of construction and operation upon which I am not competent to pass), I should say that a private right-of-way would be equally as valuable as the perpetual franchise; in fact, I do not see any difference between the two, with the qualifications I have made. There may be questions with respect to the cost of construction or the cost of operation of a system on a private right-of-way, as compared with a system under a franchise in the streets, but I do not feel competent to express an opinion upon them.

On cross-examination the witness testified in substance as follows:

I believe a franchise has an absolute value. If there were other franchises equally advantageous, that might destroy the relative value of a franchise, but it would not destroy its absolute value. I would attach more value to an exclusive franchise than I would to one which anybody could get. An exclusive franchise is considered to be valuable as excluding competition.

1066 Counsel for defendants offered in evidence a certified copy of Ordinance No. 2489 (New Series) of the Board of Supervisors of the City and County of San Francisco. Said certified copy was thereupon admitted in evidence and marked "Defendants' Exhibit No. 96" and a true copy of the same is as follows:

Bill No. 2736.

Ordinance No. 2489 (New Series)—Granting the Privilege of Laying Down Underground Pipes, Wires and Conduits, in the City Streets, upon Certain Terms and Conditions Herein Specified.

Be it Ordained by the People of the City and County of San Francisco as follows:

Section 1. The privilege is hereby granted to any person, firm or corporation, organized under the laws of the State of California, to lay down, maintain and operate in the public streets and thoroughfares of the City and County of San Francisco, pipes, wires and conduits, and connections therewith, so far as may be necessary for introducing into and supplying said City and its inhabitants with gas and electricity for lighting, heating and power purposes, upon the following terms and conditions:

First. The privileges hereby granted are subject to the provisions of all ordinances of the Board of Supervisors of said City and County and all regulations of the Board of Public Works relating to the opening of streets, and the grantees hereunder in accepting said privileges expressly consent to regulation by such ordinances and rules now in effect or which may hereafter be adopted.

Second. When the Board of Public Works shall deem it necessary to pave or repave any public street it shall serve notice upon every person, firm or corporation having pipes and conduits within the City and County used for the purposes herein specified, of its intention to so pave or repave such street.

Such person, firm or corporation, within ten days thereafter may exercise the rights herein granted as to the roadway of such streets upon written notice given to said Board of its intention to do so.

The right to lay down new pipes or conduits in said street 1067 for such purpose shall continue for thirty days after the service of the notice aforesaid, but not longer unless the time shall be extended by a resolution of the Board of Supervisors. No street pavement laid after the passage of this ordinance shall be opened for a grater length than one hundred yards for the purpose or laying pipes and conduits in the streets for supplying gas or electricity for a period of one year after the construction of such pavement, except with the consent of the Board of Supervisors.

Third. The Board of Supervisors shall fix and determine by ordinance in accordance with law, all rates or compensation to be charged or collected from consumers by said persons, firms or corporations, for supplying the heating, lighting or power service herein described and to prescribe the quality of such service. No greater rates shall ever be charged the City and County for service supplied to the municipality than are charged for like service when supplied to private consumers. Whenever the Board of Supervisors shall advertise for bids for street lighting or for other service to the municipal government within the purview of this Ordinance, all persons, firms or corporations exercising privileges granted hereunder within three hundred feet of the location for which such service is sought shall submit bids for furnishing such service.

Fourth. The privileges herein conferred are limited to the laying of underground pipes, wires, conduits and service connections, and nothing herein contained shall be construed as conferring upon the grantee the right to erect poles or wires or in any way maintain overhead construction. All pipes or conduits shall be laid in accordance with the rules and regulations of the Board of Public Works now in effect or which may hereafter be adopted.

Fifth. In the event that the City and County of San Francisco shall elect at any time to take over and operate as a public utility the business of supplying gas or electricity for heating, lighting, power and other purposes to its inhabitants, and should acquire by condemnation proceedings or otherwise, the plant and distributing system of any grantee hereunder, no value whatever shall be attached, in said proceedings, to the rights and privileges conferred by this ordinance, nor shall any value be attached thereto at any time for rate fixing purposes.

Sixth. The rights and privileges granted herein shall not be transferred except by and with the consent of the Board of Supervisors.

1068 Seventh. The Board of Supervisors expressly reserves the right to amend or repeal this Ordinance, provided that rights which may have vested hereunder prior to said repeal or amendment through the actual installation of pipes, wires and conduits shall not be affected by such repeal or amendment: Provided, further, however, that the Board of Supervisors may, by a general ordinance, compel the removal of all pipes and conduits used for any of the purposes herein set forth, from the roadways of the streets and their replacement beneath sidewalk areas.

Eighth. Any person, firm or corporation electing to exercise the privileges herein granted shall, prior to such exercise, file with the Clerk of the Board of Supervisors a written notification that they have accepted the terms of this Ordinance and elect to proceed hereunder.

Ninth. If any person, firm or corporation exercising the privilege or privileges granted by this Ordinance shall fail to fully and faithfully carry out all and any terms or conditions herein imposed upon the exercise of such grant, all such privileges shall thereupon, as to such person, firm or corporation, be terminated and forfeited, and the Board of Supervisors may, by resolution, direct the removal of any or all works of such person, firm or corporation installed under authority of this Ordinance.

Finally Passed—Board of Supervisors, October 27, 1913.

Ayes: Supervisors Bancroft, Gaglieri, A. J. Gallagher, G. E. Gallagher, Giannini, Hayden, Hilmer, Hocks, Jennings, Koshland, Mauzy, McCarthy, McLeran, Murdock, Nolan, Payot, Vogelsang.

Absent: Supervisor Murphy.

JOHN W. ROGERS,
Acting Clerk.

Approved, San Francisco, November 5, 1913.

JAMES ROLPH, JR.,
Mayor.

1069 NOTE.—Mr. M. H. Bridges, plaintiff's general auditor, during his cross examination conducted by Mr. Searls, produced a book referred to in the testimony as the "tax register" of the San Francisco Gas Light Company and was cross-examined at some length with reference to the entries purporting to show the taxes paid in the years following 1872. At the conclusion of the cross examination of Mr. Bridges upon this subject, the Master read into the record certain entries in said tax register. The following quotation from the transcript of the testimony contains all that is pertinent upon this subject, viz:

"1883: 'P. P. Tax on Franchise state \$14,288.75. do. Mains, etc., \$3,016.86. Do. paid on franchise, 1881-82 and 1882, \$30,000.'

"In the year 1884 the red ink notation at the bottom reads: 'Mains, etc. \$4,994.23. Franchise, \$16,222.'

"1885, on the same line as in the previous year and clearly indicating that it is intended to apply to it, there are figures indicating the city and county and also the state valuation, and the figures indicating the amount of the tax, as follows: Opposite the title 'Mains' on the side of the page under the previous year the following figures of valuation and tax, respectively: '\$341,800; \$383,463; \$5,671.19.' Opposite 'Franchise' are the following figures: '1,000,000; \$1,125,000; \$16,609.'

"Similarly in the following year, 1886, the figures are: '\$343,765; \$343,765;' and no entry of payment of that tax. Opposite 'Franchise': '\$1,000,000; \$1,000,000; \$21,110.54.' I don't know that it is worth while to read any further. In the following years, 1887 and following, the same practice as in the years beginning 1884 was followed, although in all those subsequent years that the tax was paid the valuation was entered. That continues down to 1892. In the year 1893, under 'Valuation' are only given the city and county valuations. There are some changes in practice in the later years."

1070 NOTE.—The Master treats the subject of the value of plaintiff's aforesaid franchise on pages 95 to 101 of his report. Near the bottom of page 98 of his report, the Master expresses his conclusion upon this subject as follows:

"I conclude that plaintiff's franchise has no separate or additional value beyond the sum of values of its physical property, together with its going value already recognized in the foregoing appraisal."

1070½

VOLUME 4.

In the Southern Division of the District Court of the United States
in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and
Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, De-
fendants and Respondents.

*Condensed Statement of Evidence Prepared Pursuant to Equity Rule
No. 75 and Order of Court Approving the Same.*

Endorsed: Filed April 5, 1922. Walter B. Maling, Clerk.

1071

SUBDIVISION II.

*Evidence Relating to Plaintiff's Gross Revenue Derived from, and Its
Expenses of Operation and Maintenance Incurred in, Conducting
Its San Francisco Gas Department Business.*

NOTE.—In order that the testimony relating to the plaintiff's revenues and its expenses of operation and maintenance may be adequately understood, it appears necessary to state here the following facts, all of which were established by evidence which was introduced before the Master but which need not be set forth in detail in this statement.

(1) Soon after the bill of complaint was filed in each of these cases, a restraining order or injunction was granted by the court enjoining the enforcement of the municipal ordinance which fixed 75¢ per thousand cubic feet as the maximum rate to be charged for gas.

(2) Plaintiff, after the restraining orders or injunctions were made in each case, adopted and put into effect a graduated gas rate schedule in which the maximum rate was 85¢ per thousand cubic feet.

(3) Plaintiff, in conformity with the provisions of the aforesaid restraining orders, kept during each of the three fiscal years, in the period from July 1, 1913 to and including June 30, 1916, a separate set of books, in which it entered the amounts actually charged to and collected from its consumers for gas furnished to them, in
1072 such manner as to show separately the amounts chargeable in
accordance with the rate established by the ordinance, to-wit,
75¢ per thousand cubic feet, the amounts actually charged and the

excess of every charge actually made over the amount of the charge authorized by ordinance.

(4) The total amount of the salaries paid to the accountants and clerks employed by the plaintiff exclusively for keeping the aforesaid separate set of books is set forth in defendants' Exhibit- Nos. 85, 86 and 87, and is referred to on page 110 of the Master's report as the "cost of keeping the record of excess collections over the rates fixed by the municipality."

(5) The Pacific Gas and Electric Company, the plaintiff in each of these cases, conducted, in addition to the business which in this record is designated as its San Francisco Gas Department Business, the business of manufacturing, distributing and selling gas and generating, distributing and selling electricity in numerous other cities and rural districts in the State of California, and also operated a street railway system in the city of Sacramento. Said plaintiff also engaged in several other activities, including the distribution and sale of water in the city of Stockton and in divers other places, and the generation and distribution of steam for heating purposes in San Francisco and Oakland. For the purpose of transacting all of its business, the said plaintiff maintained what is referred to in the testimony as its Head Office or General Executive Organization,

1073 including its president, general manager, treasurer, secretary, and the heads of its electric, gas, legal and other departments. The plaintiff also maintained a local or district organization, which acted under the general direction and supervision of its head office or central organization. The plaintiff's head or central organization had charge of the general management and supervision of its entire business. In the preparation of the statements hereinafter referred to, showing the plaintiff's gross revenues and expenses of operation and maintenance, in its San Francisco gas department, the plaintiff's general auditor made an apportionment of the plaintiff's general and administrative expenses, which included the salaries paid to the members of its head office organization and all other expenses which in their nature were not assignable directly to the several branches or departments of its business. The basis of this apportionment was, speaking generally, and after making certain adjustments which were deemed appropriate because of the distinct character of the plaintiff's street railway business, the ratio of the number of consumers in each district or department to the total number of consumers served by the plaintiff in all of its departments and in all districts in which it operated. The defendants contended that this basis of apportionment was not so reasonable or fair as the ratio of plaintiff's gross revenue in each department or district to its gross revenue received in all of its departments and districts. The Master, as appears by next to the last paragraph on page 110 of

1074 his report sustained the city's contention in this respect.

M. H. BRIDGES, plaintiff's general auditor, recalled as a witness for the plaintiff, having previously qualified as an expert accountant,

Statement of Revenue and Costs, E.

Item.	Year J 1912, to 30, 19
Gross Revenue:	
Sales of Gas in San Francisco.....	3,142,71
Municipal Street Lighting Service.....	86,93
Rental of Gas Arcs.....	44,16
Sales of Gas to Other Departments.....	36,92
Total Gross Revenue.....	3,310,74
Expenses:	
Maintenance of Generating Capital.....	70,40
Maintenance of Transmission Capital.....	2,58
Maintenance of Distribution Capital.....	218,33
Generating Expenses	988,92
Transmission Expenses	32,70
Distribution Expenses	592,73
Taxes (Revised—Exhibit No. 25).....	117,33
Floating Debt Interest (Revised).....	5,84
Uncollectible Accounts	22,00
Administrative Expenses	166,40
Total Expenses	2,217,40
Net Operating Revenue (before deduction for Reserves)....	1,093,24
Additions to Net Revenue, to correct account details.....	
Corrected Net Operating Revenue, (before deduction for Reserves)—Revised	1,093,24



and having shown that he had charge and supervision of all of plaintiff's books of account, testified in substance as follows, viz:

I have prepared and compiled from the plaintiff's books of account, which have been kept in conformity with the system of accounting prescribed by the Railroad Commission of the State of California, a statement showing the gross revenue received by the plaintiff from its San Francisco gas department business during each of the fiscal years in the period beginning July 1, 1912, and ending June 30, 1916, and also showing the expenses of operation and maintenance, incurred by the plaintiff in conducting its said business for each of said fiscal years. This statement also shows what in our accounting system is designated as the Net Operating Revenue before Deduction for Reserves. This statement was thereupon admitted in evidence and marked "Plaintiff's Exhibit No. 19."

It appearing during the direct examination of Mr. Bridges that he had inadvertently and through a misapprehension of the law made an error in the apportionment of taxes to the San Francisco gas department, and also had made an error in the apportionment of the item of Floating Debt Interest, the Master afforded him an opportunity to prepare a supplemental statement for the purpose of
1075 correcting these errors. It is not deemed necessary to insert in this statement the details of plaintiff's revenues and expenses. A summary of plaintiff's San Francisco gas department gross revenue and expenses, wherein the items of Taxes and Floating Debt Interest are corrected, was admitted in evidence and marked "Plaintiff's Exhibit No. 38." A true copy of said Exhibit No. 38 is as follows:

(Here follows pasted table marked page 1076.)

1077 At the conclusion of plaintiff's testimony, upon the subject of its San Francisco gas department gross revenue and expenses of operation and maintenance, the defendants called as their witness Mr. FREDERICK C. GRIMSHAW, who duly qualified as an expert accountant and testified that he had made an extended examination of plaintiff's books of account and had prepared four statements in which he set forth certain corrections which the defendants contended should be made in the plaintiff's statement of gross revenue and expenses. The four statements prepared by Mr. Grimshaw were admitted in evidence and marked "Defendants' Exhibits Nos. 85, 86, 87 and 88."

Subsequently, Mr. M. H. BRIDGES was recalled as a witness for the plaintiff and testified that he had prepared a comparative statement in which he had set forth in parallel columns plaintiff's gross revenue and expenses as shown in Exhibit No. 38 and corresponding items in the statements prepared by the defendants and the differences between the items in plaintiff's statement and the corresponding items in the defendants' statements. This comparative statement was admitted in evidence and marked "Plaintiff's Exhibit No. 108" and a true copy thereof is as follows:

(Here follow paster tables marked pages 1078, 1078½ and 1079.)

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Statement Showing Difference Between City's and Co.'s Statements of Revenues and Operating Expenses, Year

At ordinance rates.							
	Ex. 38, P. G. & E. Co.	Ex. 85 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38, P. G. & E. Co.	Ex. 85 S1A, City.
Gross Revenue	3,405,532 51	3,414,182 96	8,650 45*	8,650 45	.....	3,689,858 22	3,698,508 67
Expenses:							
Maint. of Generating Cap...	48,447 74	46,647 74	1,800 00	1,800 00	.....	48,447 74	46,647 74
" " Transm. Capital...	7,939 18	7,471 18	468 00	.....	468 00	7,939 18	7,471 18
" " Distrib'n Cap.....	150,047 25	143,715 04	6,332 21	6,299 81	32 40	150,047 25	143,715 04
Generating Expenses.....	981,342 28	A 981,297 28	45 00	.....	45 00	981,342 28	A 981,297 28
Transmission Expenses.....	28,773 36	A 28,135 96	637 40	637 40	.....	28,773 36	A 28,135 96
Distribution Expenses.....	547,145 97	526,975 66	20,170 31	.....	20,170 31	547,145 97	526,975 66
Taxes	147,943 35	147,943 35	.....	.....	.....	148,221 57	148,221 57
Floating Debt Interest.....	20,663 48	.....	20,663 48	.....	20,663 48	20,663 48	.....
Uncollectible Accounts.....	27,489 45	24,970 02	2,519 43	.....	B 2,519 43	27,489 45	27,265 72
Administrative Expenses....	162,382 40	98,166 03	64,216 37	.....	64,216 37	162,382 40	58,166 03
Total Expenses.....	2,122,174 46	2,005,322 26	116,852 20	8,737 21	108,114 99	2,122,452 68	2,007,896 18
Net Operating Revenue (be- fore deducting for Re- serves)	1,283,358 05	1,408,860 70	125,502 65*	17,387 66	108,114 99	1,567,405 54	1,690,612 49
Additions to Net Revenue to correct account details ...	17,387 66	.....	17,387 66	17,387 66	.....	17,387 66	.....
Corrected Net Operating Re- venue (before deducting for Reserves).....	1,300,745 71	1,408,860 70	108,114 99*	.....	108,114 99	1,584,793 20	1,690,612 49
"A" Includes Electric Current:							
Generating Expenses.....	4,211 80						
Transmission Expenses	13,137 56						
Total	27,349 36						

"B"—Ordinance
cept in this account

PLAINTIFF'S EXHIBIT No. 108, PAGE 1.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Showing Difference Between City's and Co.'s Statements of Revenues and Operating Expenses, Year 1913-1914.

At ordinance rates.				At company rates.				
Ex. 85 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38, P. G. & E. Co.	Ex. 85 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.
3,414,182 96	8,650 45*	8,650 45	.....	3,689,858 22	3,698,508 67	8,650 45*	8,650 45	.....
46,647 74	1,800 00	1,800 00	.....	48,447 74	46,647 74	1,800 00	1,800 00	.....
7,471 18	468 00	.....	468 00	7,939 18	7,471 18	468 00	.....	468 00
143,715 04	6,332 21	6,299 81	32 40	150,047 25	143,715 04	6,332 21	6,299 81	32 40
A 981,297 28	45 00	.....	45 00	981,342 28	A 981,297 28	45 00	.....	45 00
A 28,135 96	637 40	637 40	.....	28,773 36	A 28,135 96	637 40	637 40	.....
526,975 66	20,170 31	.....	20,170 31	547,145 97	526,975 66	20,170 31	.....	20,170 31
147,943 35	.....	.....	.....	148,221 57	148,221 57	.....	.....	.....
.....	20,663 48	.....	20,663 48	20,663 48	.....	20,663 48	.....	20,663 48
24,970 02	2,519 43	.....	B 2,519 43	27,489 45	27,265 72	223 73	.....	B 223 73
98,166 03	64,216 37	.....	64,216 37	162,382 40	58,166 03	64,216 37	.....	64,216 37
2,005,322 26	116,852 20	8,737 21	108,114 99	2,122,452 68	2,007,896 18	114,556 50	8,737 21	105,819 29
1,408,860 70	125,502 65*	17,387 66	108,114 99	1,567,405 54	1,690,612 49	.....	.....	.....
.....	17,387 66	17,387 66	.....	17,387 66	.....	.....	.....	.....
1,408,860 70	108,114 99*	.....	108,114 99	1,584,793 20	1,690,612 49	.....	.....	.....
..... 4,211 80								
..... 13,137 56								
..... 27,349 36								

"B"—Ordinance and Company Rates do not change difference except in this account.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Statement Showing Difference Between City's and Co.'s Statements of Revenues and Operating Expenses, Y

At ordinance rates.

	Ex. 38, P. G. & E. Co.	Ex. 86 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38, P. G. & E. Co.	Ex. 86 S1A, City.
Gross Revenue	3,635,061 53	3,641,213 06	6,151 53*	6,151 53	.....	3,997,138 99	4,003,290 ..
Expenses:							
Maint. of Generat'g Capital.	54,588 58	55,702 66	1,114 08*	1,800 00*	685 92	54,588 58	55,702 66
" " Transm. Capital..	2,951 04	2,576 04	375 00	.....	375 00	2,951 04	2,576 04
" " Distrib'n Cap.	136,182 25	136,130 05	52 20	.....	52 20	136,182 25	136,130 05
Generating Expenses	1,064,297 75	A 1,063,762 91	534 84	.....	534 84	1,064,297 75	A 1,063,762 91
Transmission Expenses	34,117 89	A 34,117 89	.....	.....	.....	34,117 89	A 34,117 89
Distribution Expenses	577,895 90	548,241 73	29,654 17	.....	29,654 17	577,895 90	548,241 73
Taxes	162,320 90	162,320 90	.....	.....	.....	168,266 45	168,266 45
Floating Debt Interest	24,818 68	.....	24,818 68	.....	24,818 68	24,818 68	.....
Uncollectible Accounts	30,147 38	27,883 40	2,263 98	.....	2,263 98	30,147 38	30,930 58
Administrative Expenses	177,436 60	107,660 40	69,776 20	.....	69,776 20	177,436 60	107,660 40
Total Expenses	2,264,756 97	2,138,305 98	126,360 99	1,800.00*	128,160 99	2,270,702 52	2,147,388 78
Net operating Revenue (be- fore deducting for Re- serves)	1,370,304 56	1,502,817 08	132,512 52*	4,351 53	128,160 99	1,726,436 47	1,855,901 88
Additions to Net Revenue to correct account details	4,351 53	.....	4,351 53	4,351 53	.....	4,351 53	.....
Corrected Net Operating Re- venue (before deducting for Reserves)	1,374,656 09	1,502,817 08	128,160 99*	.....	128,160 99	1,730,788 00	1,855,901 88
"A" Includes Elec. Current:							
Generating Exp.	24,251 47						
Transmission Exp.	19,832 08						
		44,083 55					

[*In red in copy.]

"B"—Ordinance
cept in this account

PLAINTIFF'S EXHIBIT No. 108, PAGE 2.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Showing Difference Between City's and Co.'s Statements of Revenues and Operating Expenses, Year 1914-1915

At ordinance rates.				At company rates.				
Ex. S6 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38. P. G. & E. Co.	Ex. 86 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.
641,213 06	6,151 53*	6,151 53	.....	3,997,138 99	4,003,290 52	6,151 53*	6,151 53	.....
55,702 66	1,114 08*	1,800 00*	685 92	54,588 58	55,702 66	1,114 08*	1,800 00*	685 92
2,576 04	375 00	.....	375 00	2,951 04	2,576 04	375 00	.....	375 00
136,130 05	52 20	.....	52 20	136,182 25	136,130 05	52 20	.....	52 20
106,762 91	534 84	.....	534 84	1,064,297 75	A 1,063,762 91	534 84	.....	534 84
34,117 89	.....	.....	.....	34,117 89	A 34,117 89	.....	.....	.....
548,241 73	29,654 17	.....	29,654 17	577,895 90	548,241 73	29,654 17	.....	29,654 17
162,320 90	.....	.....	.....	168,266 45	168,266 45	.....	.....	.....
.....	24,818 68	.....	24,818 68	24,818 68	.....	24,818 68	.....	24,818 68
27,883 40	2,263 98	.....	2,263 98	30,147 38	30,930 58	783 20*	.....	B 783 20*
107,660 40	69,776 20	.....	69,776 20	177,436 60	107,660 40	69,776 20	.....	69,776 20
138,395 98	126,360 99	1,800.00*	128,160 99	2,270,702 52	2,147,388 71	123,313 81	1,800 00*	125,113 81
102,817 03	132,512 52*	4,351 53	128,160 99	1,726,436 47	1,855,901 81	129,465 34*	4,351 53	125,113 81
.....	4,351 53	4,351 53	.....	4,351 53	.....	4,351 53	4,351 53	.....
102,817 08	128,160 99*	.....	128,160 99	1,730,788 00	1,855,901 81	125,113 81*	.....	125,113 81

"B"—Ordinance and Company Rates do not change differences except in this account.

24,251 47
19,832 08
44,083 55

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Statement Showing Difference Between City's and Co.'s Statements of Revenue and Operating Expenses, P.

	At ordinance rates.						
	Ex. 38, P. G. & E. Co.	Ex. 87 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38, P. G. & E. Co.	Ex. 87 S1A, City.
Gross Revenue.....	3,784,684 65	3,804,653 89	19,969 24*	16,881 18	3,088 06	4,163,065 30	183,034
Expenses:							
Maint. of Generat'g Cap....	70,364 81	69,569 99	794 82	.....	794 82	70,364 81	69,569
“ “ Transm. Cap.	124,022 63	122,823 49	1,199 14	.....	.....	1,797 72	1,797
“ “ Distrib'n Cap... ..	1,797 72	1,797 72	.....	.....	1,199 14	124,022 63	122,823
Generating Expenses.....	1,025,446 19	1,025,023 77	422 42	.....	422 42	1,025,446 19	025,023
Transmission Expenses.....	50,470 01	50,301 49	168 52	.....	168 52	50,470 01	50,301
Distribution Expenses.....	618,718 76	587,257 53	31,461 23	.....	31,461 23	618,718 76	587,257
Taxes	185,690 41	185,690 41	.....	.....	.....	205,442 47	205,442
Floating Debt Interest.....	5,547 00	.....	5,547 00	.....	5,547 00	5,547 00	.....
Uncollectible Accounts	29,862 71	26,917 35	2,945 36	.....	2,945 36	29,862 71	29,862
Administrative Expenses....	157,384 19	111,638 27	45,745 92	.....	45,745 92	157,384 19	111,638
Total Expenses.....	2,269,304 43	2,181,020 02	88,284 41	.....	88,284 41	2,289,056 49	2,203,717
Net Operating Revenue (be- fore deducting for Re- serves)	1,515,380 22	1,623,633 87	108,253 65*	16,881 18	91,372 47	1,874,008 81	1,979,317
Additions to Net Revenue to correct account details....	16,881 18	.....	16,881 18	16,881 18	.....	16,881 18	.....
Corrected Net Operating Rev- enue (before deducting for Reserves)	1,532,261 40	1,623,633 87	91,372 47*	.....	91,372 47	1,890,889 99	1,979,317

[*In red in copy.]

PLAINTIFF'S EXHIBIT No. 108, PAGE 3.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Showing Difference Between City's and Co.'s Statements of Revenue and Operating Expense Year 1915-1916.

At ordinance rates.				At company rates.				
Ex. 87 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.	Ex. 38, P. G. & E. Co.	Ex. 87 S1A, City.	P. G. & E. Co. in excess of City.	Diff. agreed to by P. G. & E. Co.	Diff. not agreed to by P. G. & E. Co.
3,804,653 89	19,969 24*	16,881 18	3,088 06	4,163,065 30	183,034 54	19,969 24*	16,881 18	3,088 06
69,569 99	794 82	.....	794 82	70,364 81	69,569 99	794 82	.....	794 82
122,823 49	1,199 14	.....	.....	1,797 72	1,797 72	.....	.....	.....
1,797 72	.....	.....	1,199 14	124,022 63	122,823 49	1,199 14	.....	1,199 14
1,025,023 77	422 42	.....	422 42	1,025,446 19	025,023 77	422 42	.....	422 42
50,301 49	168 52	.....	168 52	50,470 01	50,301 49	168 52	.....	168 52
587,257 53	31,461 23	.....	31,461 23	618,718 76	587,257 53	31,461 23	.....	31,461 23
185,690 41	.....	.....	.....	205,442 47	205,442 47	.....	.....	.....
.....	5,547 00	.....	5,547 00	5,547 00	.....	5,547 00	.....	5,547 00
26,917 35	2,945 36	.....	2,945 36	29,862 71	29,862 71	.....	.....	.....
111,638 27	45,745 92	.....	45,745 92	157,384 19	111,638 27	45,745 92	.....	45,745 92
2,181,020 02	88,284 41	.....	88,284 41	2,289,056 49	2,203,717 44	85,339 05	.....	85,339 05
1,623,633 87	108,253 65*	16,881 18	91,372 47	1,874,008 81	1,979,317 10	105,308 29*	16,881 18	88,427 11
.....	16,881 18	16,881 18	.....	16,881 18	.....	16,881 18	16,881 18	.....
1,623,633 87	91,372 47*	.....	91,372 47	1,890,889 99	1,979,317 10	88,427 11*	.....	88,427 11



1080 In the aforesaid exhibits relating to plaintiff's gross revenue and expenses of operation and maintenance, the plaintiff's revenue and expenses as they would have been if the plaintiff had made no charges for gas in excess of the amounts authorized by the municipal ordinance fixing rates are indicated as Revenue and Expenses "in accordance with ordinance rates," and its actual revenue and expenses under the circumstances stated are shown as Revenue and Expenses "including revenue in excess of ordinance rates."

The subjects of Expenses of Operating and Maintenance, including taxes, is treated by the Master on pages 107 to 110 of his report, together with three appendices attached to his report and printed on pages 151 to 156. On page 130 of his report, the Master sets forth the plaintiff's gross revenue in accordance with ordinance rates, but through inadvertence slightly understated the amounts, as will appear by reference to plaintiff's Exhibit No. 108.

No error has been assigned by the plaintiff on its appeal from the final decrees in the above-entitled suits, in respect to the Master's findings, with respect to plaintiff's expenses of operation and maintenance. But the finding of the Master with respect to the item of administrative expenses is involved in the plaintiff's exception to the Master's finding with respect to the value of management and the pertinent testimony will be inserted in this statement in the part dealing with that subject.

1081

SUBDIVISION III.

Evidence Relating to the Cost of Procuring (A) Insurance Against Loss by Fire, (B) Insurance Against Liability to Employees and the Public for Injuries to Person and Damage to Property Resulting from Casualties, and (C) Insurance of Automobiles.

A. Cost of fire insurance.

Mr. THOMAS McCAUGHERN, a witness called for the plaintiff, having qualified as an insurance expert, testified in substance as follows:

I am at present district secretary of the Board of Fire Underwriters in San Francisco and I have held that position for about 4 months. Prior to that, I was surveyor for the Board of Fire Underwriters, serving them in various capacities for eight or nine years. Before coming to San Francisco I was with the Board of Fire Underwriters in Portland and later in the county districts outside of San Francisco. I have become familiar with the rates for fire insurance as established by the Board of Fire Underwriters, and also its regulations. Member companies of the Board of Fire Underwriters charge rates established by the latter.

The Board of Fire Underwriters of San Francisco is an association or bureau established and maintained by 50 or 60 fire insurance companies engaged in the fire insurance business here. This board is maintained for the purpose of making surveys and inspections of

insurable property, establishing rates and examining forms
1082 of documents used in conducting the business of fire insurance. Most of the fire insurance companies actually engaged in business in San Francisco are members of this board; but there are some fire insurance companies doing business here who are not members. The information gathered and compiled by the Board of Fire Underwriters is available for the use of non-member companies as well as member companies and in fact for the use of everyone.

Nearly all of the buildings and structures used by the Pacific Gas and Electric Company in connection with its gas business have been surveyed for the purpose of naming rates. Some of the structures have not been specially surveyed; but in every case there is a tariff rate that covers the property.

During the period from July 1, 1913, to June 30, 1916, there were fire insurance rates established by the Board of Fire Underwriters applicable to the aforesaid buildings and structures of the Pacific Gas and Electric Company and also regulations governing the application of these rates to buildings and structures of that general character. These regulations take into consideration the various conditions that affect the fire risk.

The witness was here shown a statement containing a list of the plaintiff's buildings and structures used in its gas business in
1083 San Francisco and he thereupon testified that those buildings and structures had been examined under his supervision and direction by surveyors employed by the Board of Fire Underwriters.

I have caused to be prepared under my direction by the staff of the Board of Fire Underwriters a list or schedule of the rates of insurance applicable to the buildings and structures included in the list which I have been shown. This list shows separately the insurance rates applicable in cases where the property is insurable for one year only, and the rates applicable to structures which are insurable for a term of three years. The board has a classification of rates which it designates as a tariff. Tariff rates are applied in cases where a special survey has not been made. In cases where a special survey is made, special rates are established which may be either higher or lower than the tariff rate according to the circumstances of the case and the apparent fire hazard. In the list which I have already mentioned and which shows the rates of insurance applicable to the plaintiff's structures, the rates based on special surveys and the tariff rates are distinguished. In the aforesaid schedule of rates I have indicated the different rates which are applicable when property is insured at 70% of its value, 80% of its value and 90% of its value. In some instances no credit or allowance is given for
1084 co-insurance unless the property is insured to the extent of at least 90% of its appraised value. In this list tariff rates are shown as applicable to the plaintiff's wharf, gas holders (with the possible exception of the Potrero gas holders), office building and some other structures.

N. B.—The schedule or list of rates concerning which this witness testified was used by the witness, Mr. W. D. Sultan, who prepared a statement which was subsequently introduced in evidence and marked plaintiff's Exhibit No. 42.

On cross-examination the witness testified in substance as follows:

As a rule an insurance surveyor, in going about his work, starts at the roof of the building and works down. The idea being to get at the structural features; the matter of additions on the roof, skylight construction, wall holes, whether it is a steel frame or reinforced concrete building, elevators and stairway, the matter of construction as to protection at floor openings, the nature of the windows at the floor openings and the light wells. After the surveyor has examined the structural end, it is then a question of occupancy. A survey is made solely with respect to the building construction. Of course there are exposure and opening charges. If a frame building adjoins a brick building, it is regarded as an exposure. If there is an unprotected exposure opposite the frame building, it is subject to certain charges. Each special risk 1085 is give attention. The surveyor, in effect, determines the rates unless there are unusual conditions. The survey is brought to the District Secretary by whose authority the rate is promulgated. The secretary has a certain basis to work on, taken from insurance companies' experience with certain classes of risks.

The rates applying to property peculiar to the gas business, compressors, holders, generating sets, etc. are based upon conditions as the surveyor finds them. The figure applicable would be determined by the comparison with some other plant and by the judgment of the District Secretary based upon his experience and the experience of other underwriting concerns throughout the country.

I could not say whether any companies, as a matter of fact, insure gas holders in California. It might be that the only experience the District Secretary would have to base his judgment on would be experience entirely out of this state. I could not say what the experience of the companies has been with reference to properties peculiar to gas works. We take the figure given in the manual and apply that. I think the hazard would be the same here as elsewhere. In making up the table of rates no attempt was made to find out what the losses were in the experience of the Pacific Gas & Electric Company.

Commissions normally paid fire insurance agents run about 15% to 20% and 25%. The general level of insurance rates has been reduced in this city within the last few years, applying mostly to mercantile risks. The office building of the Pacific Gas & Electric Company would be a mercantile risk. The compressor building 1086 would be a special hazard. So far as I know, no survey was made of the gas holders. I have no information in my possession which would enable me to determine how the rate on gas holders was fixed.

Mr. J. C. McCAUGHERN, a witness called by defendant, testified as follows:

Mr. Searls: What is the percentage of overhead loading ordinarily included in the fire insurance rate and what in general is this percentage intended to cover?

A. Answering your inquiry, I will state that, while the cost of conducting the business will vary with different companies, I think the ratio of 40% to the premium would be a fair average. The cost, I mean, is all expense incurred, except loss payments.

Mr. R. J. CANTRELL, a witness called for the plaintiff, testified in substance as follows:

I am the property agent of the Pacific Gas and Electric Company, and as such I have attended to insuring such parts of the company's property as have been insured for several years past. I recently took up with Mr. McCaughern, who represented the Board of Fire Underwriters, the matter of insurance rates applying 1087 to the buildings and structures of this company in San Francisco. I think there are published tariff rates applying to gas holders at the Potrero. Upon making inquiry, I have ascertained that the rates shown in the schedule compiled under the direction of Mr. McCaughern as applicable to plaintiff's gas holders at the Potrero are special rates based on a survey.

On cross-examination the witness testified in substance as follows:

I do not know whether the special rate on the gas holders at the Potrero is the same as the tariff rate or not.

The Pacific Gas and Electric Company carries some fire insurance covering buildings in San Francisco upon which it actually pays premiums. The buildings so insured are the old office building on Sutter Street, the warehouse building at 5th and Tehama with its contents, and the building at 5th and Howard Streets. I have tried to keep the warehouses insured above 70% of their value. The rate applicable to plaintiff's gas holders was based on a survey made in 1908 and there has been no change in it since then.

1088 Mr. W. D. SULTAN, a witness called by the plaintiff, having qualified as a valuation engineer employed in plaintiff's auditing department, testified in substance as follows:

I have prepared an exhibit listing the buildings and other structures of the Pacific Gas and Electric Company used in its gas business in San Francisco and showing what it would cost to insure the same against loss by fire in accordance with the rates of insurance testified to by Mr. Thomas McCaughern. The items in this exhibit show the annual premiums upon such buildings and structures at the rates specified. This exhibit includes premiums paid by plaintiff for boiler and elevator insurance. In preparing this exhibit, I used, as the values of structures, the values shown in the Jones

281

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70'

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—

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PLAINTIFF'S EXHIBIT No. 42, PAGE 1.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Statement of Fire Insurance (Including Boiler and Elevator) Years 1912-1913, 1913-1914, 1914-1915, and 1915-1916.

Summary.

Basis: Jones Valuation Plus P. G. & E. Co.'s Overhead.

Description.	Year beginning July 1, 1912, and ending June 30, 1913.		Year beginning July 1, 1913, and ending June 30, 1914.		Year beginning July 1, 1914, and ending June 30, 1915.	
	Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance on 90% value.
Potrero Station.....	19,762 69	23,941 23	19,762 69	23,941 23	19,762 69	23,941 23
Independent Station.....	4,015 38	4,880 27	4,015 38	4,880 27	4,015 38	4,880 27
North Beach Station.....	2,946 16	3,787 93	2,946 16	3,787 93	2,946 16	3,787 93
Metropolitan Station.....	8,863 86	10,656 37	8,863 86	10,656 37	8,863 86	10,656 37
Martin Gas Station.....	6,729 53	8,652 26	6,729 53	8,652 26	6,729 53	8,652 26
Miscellaneous.....	2,600 11x	2,980 48x	2,628 93x	3,014 86x	2,647 18x	3,033 08x
Totals.....	44,917 73	54,898 54	44,946 55	54,932 92	44,964 80	54,951 14

Notes.

(1) New Jones sets put into service Year 1915-1916.

(2) Martin Station taken out of service Year 1915-1916.

x Boiler and Elevator insurance included in Miscellaneous, and taken at 100%.

Issued by Auditing Department, San Francisco.

PLAINTIFF'S EXHIBIT No. 42, PAGE 1.

Pacific Gas and Electric Company.

Gas Department.

San Francisco District.

Statement of Fire Insurance (Including Boiler and Elevator) Years 1912-1913, 1913-1914, 1914-1915, and 1915-1916.
Summary.

P. G. & E. Co.'s Overhead.

Year beginning July 1, 1912, and ending June 30, 1913.		Year beginning July 1, 1913, and ending June 30, 1914.		Year beginning July 1, 1914, and ending June 30, 1915.		Year beginning July 1, 1915, and ending June 30, 1916.	
Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance on 90% value.
19,762 69	23,941 23	19,762 69	23,941 23	19,762 69	23,941 23	23,192 64 ⁽¹⁾	27,875 09
4,015 38	4,880 27	4,015 38	4,880 27	4,015 38	4,880 27	4,015 38	4,880 27
2,946 16	3,787 93	2,946 16	3,787 93	2,946 16	3,787 93	2,946 16	3,787 93
8,863 86	10,656 37	8,863 86	10,656 37	8,863 86	10,656 37	8,863 86	10,656 37
6,729 53	8,652 26	6,729 53	8,652 26	6,729 53	8,652 26 ⁽²⁾
2,600 11x	2,980 48x	2,628 93x	3,014 86x	2,647 18x	3,033 08x	2,976 12x	3,444 96x
44,917 73	54,898 54	44,946 55	54,932 92	44,964 80	54,951 14	41,944 16	50,644 62

Notes.

⁽¹⁾ New Jones sets put into service Year 1915-1916.

⁽²⁾ Martin Station taken out of service Year 1915-1916.

x Boiler and Elevator insurance included in Miscellaneous, and taken at 100%.

ent, San Francisco.

appraisement (Exhibit No. 3) plus the overhead estimated by Mr. Vincent. In the case of the new office building and the new generators which were constructed after the date of the Jones appraisement, I used the values shown in the exhibits presented and testified to by Mr. Vincent.

With the values determined as indicated, I have made the necessary computations and applied the rates given by Mr. McCaughern so as to determine the annual premiums for fire insurance. In cases where the buildings and structures were insurable for a term exceeding one year, two rates were given, one covering a single year and the other covering the three year insurance. In such 1089 cases I have used one third of the three year rate in computing the annual premium. The three year rate was usually double the one year rate.

The computations in this exhibit have been made by me or under my supervision and direction and I believe them to be correct.

This exhibit was thereupon admitted in evidence and marked plaintiff's Exhibit No. 42.

Page 1 of plaintiff's Exhibit No. 42 contains a summary showing what it would have cost the plaintiff to insure the buildings and structures listed therein at the rates which, according to Mr. McCaughern's testimony, were applicable during each of the four years in the period beginning July 1, 1912, and ending June 30, 1916. A true copy of said summary (page 1 of plaintiff's Exhibit No. 42) is as follows:

(Here follows pasted table marked page 1090.)

1091 Mr. FRED C. GRIMSHAW, a witness called for the defendants, having previously qualified as an expert accountant, testified in substance as follows:

I have compiled from the books of account of plaintiff and its predecessor, the San Francisco Gas and Electric Company, a statement showing the charges and credits to a reserve intended to cover losses by fire and charges for boiler insurance and premiums on surety bonds, during the period commencing with the year 1908 and ending with the year 1916. During the period from 1908 to 1911, both years included, the San Francisco Gas and Electric Company maintained a separate reserve for the items which I have mentioned. In the latter part of 1911 the San Francisco Gas and Electric Company conveyed its property and business to the Pacific Gas and Electric Company. During the years from 1912 to 1916, both years included, the Pacific Gas and Electric Company maintained a general reserve for its entire system. For the purpose of this case, I have assumed that the entire amount appropriated by the Pacific Gas and Electric Company to this reserve each year after January 1, 1912, should be apportioned between the San Francisco gas department and the other departments of the Pacific Gas and Electric Company on the basis of the losses incurred in those departments respectively.

1092 Upon this assumption, the following statement shows the charges and credits to the reserve created for the purposes already mentioned for the San Francisco gas department:

Year.	Charges.	Credits.
1908 .....	.....	\$11,741.64
1909	\$9,660.02	11,741.64
1910 .....	.....	11,629.14
1911	3,207.47	13,685.32
Balance	35,930.25	.....
Total	\$48,797.74	\$48,797.74
1912	\$2,593.87	\$3,908.85
1913	3,262.69	5,300.70
1914	2,282.22	3,570.00
1915	480.63	240.48
1916	1,197.53	3,826.07
Total	\$9,816.94	\$16,846.10

The statement which the witness, Mr. Grimshaw, testified that he had compiled was admitted in evidence and marked defendant's Exhibit No. 89.

1093 Mr. N. RANDALL ELLIS, having qualified as a valuation engineer, was recalled for the defendant and testified in substance as follows:

Defendant's Exhibit 89, Page 1, shows the following charges for fire insurance in the San Francisco Gas District during the years 1909 to 1916.

1909	\$9,660.62
1910 .....	.....
1911	3,207.47
1912	2,593.87
1913	3,262.69
1914	2,282.22
1915	480.63
1916	1,197.53
	<hr/>
	\$22,684.43

Period 8 years, average per year, \$2,835.00.

The following table from Ex. 89, p. 1, shows the annual amounts set up by the Company for the entire system, for the years in controversy, and the proportion allocated to the San Francisco Gas District on the basis of charges against the fund, as determined by the City's Auditor.

	Reserve allotment, entire system.	Proportion of reserve allotment allocated to S. F. gas district.
1913	\$15,000.00	\$5,300.70
1914	15,000.00	3,570.00
1915	12,000.00	240.48
1916	24,002.00	3,826.07

In view of the experience of the Company over a period of 8 years, showing an average annual expenditure of \$2,835.00, and after considering the proportion of the Company's annual allotment to the total system reserve, which would be allocated to the 1004 San Francisco gas district. I am of the opinion that an annual allowance of \$10,000.00 for Fire, Surety and Boiler Insurance would be ample and I have allowed such sum for each of the years in question.

Surety and boiler insurance are carried by the company in its fire insurance reserve.

In this connection I might state that during the period from 1908 to November, 1911, when the San Francisco Gas District set up a separate reserve, such reserve accumulated a surplus of \$35,930.25 which at the time of the merger was transferred to "Corporation Surplus."

I further believe that due to the type of construction of the gas plants, largely of brick and steel, and the fact that they being in continuous operation there is always a force on duty, the possibility of a fire damage of any consequence is remote. I further believe from such investigation and information as I could obtain that gas companies as a rule carry their own insurance and that fire losses on the whole are small.

The following table shows the Company's claims for fire insurance allowance (Ex. 42, P. 1) and the effect of deducting 40% from their figures:

1913-14.		1914-15.		1915-16.	
Insurance on 70% value.	Insurance on 90% value.	Insurance on 70% value.	Insurance, 90% value.	Insurance on 70% value.	Insurance on 90% value.
\$44,946.55	\$54,932.92	\$44,964.80	\$54,951.14	\$41,994.16	\$50,644.62
Result After Deduction 40%.					
\$26,967.50	\$32,959.75	\$26,978.88	\$32,970.68	\$25,196.49	\$30,386.77

1095 On cross-examination the witness testified in substance as follows, to wit:

I have never had any experience as an actuary either for life insurance, fire insurance or casualty insurance companies and I have never studied the system and the method of conducting business to such an extent that I could qualify as an expert upon rates and charges for insurance.

I should say that the Pacific Gas & Electric Company's experience over a number of years would afford a very good criterion on account of its diversified activities for the basis of estimating rates.

1096 B. Cost of casualty insurance.

Mr. M. H. BRIDGES, a witness recalled for the defendant, testified in substance as follows:

I have prepared a statement showing the estimated amount to be reserved as casualty insurance for plaintiff's San Francisco gas department during the fiscal years commencing July 1, 1912, 1913, 1914 and 1915. This statement was admitted in evidence and marked plaintiff's Exhibit No. 30. We have not carried any casualty insurance with insurance companies in the San Francisco gas department, except boiler and elevator insurance. This exhibit (No. 30) is an estimate of the cost of procuring casualty insurance at the prevailing rates or premiums charged by insurance companies, the plaintiff claiming the right to appropriate an equal amount to its casualty reserve and to charge the same as an expense.

Page 1 of Exhibit No. 30 is a recapitulation by fiscal year periods showing the amount of premiums computed on the basis of office, plant and distribution labor, together with total premiums. It covers the four years between July 1, 1912, and July 1, 1916. A true copy of page 1 of Exhibit No. 30 is as follows:

PLAINTIFF'S EXHIBIT NO. 30, PAGE 1.

Pacific Gas and Electric Company.

Gas Department

San Francisco District.

Statement of Casualty Insurance.

Recapitulation.

Period.	Office labor.		Plant & distr. labor.		Total labor.	Total premium.
	Labor.	Premium.	Labor.	Premium.		
July 1, 1912-June 30, 1913.....	\$215,908 45	\$237 48	\$544,719 00	\$43,534 30	\$760,627 45	\$43,771 78
July 1, 1913-June 30, 1914.....	223,073 00	302 71	476,160 72	29,111 30	609,234 32	29,414 01
July 1, 1914-June 30, 1915.....	253,868 74	343 42	476,503 35	19,621 96	730,372 09	19,965 38
July 1, 1915-June 30, 1916.....	259,001 84	285 56	472,813 95	18,818 01	732,415 79	19,103 57

1098 The remaining pages show in detail the amounts of money paid in each of said years for labor divided into the various classes, such as office, generating, transmission and distribution labor, in accordance with the classification employed by casualty insurance companies in their rate schedules.

The amounts of money expended for labor as shown in Exhibit No. 30 were taken from the records of the company and its payrolls.

The rates or premiums used in this Exhibit No. 30 in computing the cost of casualty insurance were obtained from Mr. S. F. Norwood.

Plaintiff's Exhibit No. 30 contains a correct compilation from the books and records in my office of the amounts of money expended for labor. The figures are limited to the gas department in the San Francisco district and also to the amounts of money expended for labor employed by plaintiff for the operation and maintenance of gas department properties and conducting business and do not include amounts expended for labor in construction work. The mathematical computations contained or indicated in Exhibit No. 30 are correct to the best of my knowledge and belief.

1099 On cross-examination the witness testified in substance as follows:

Exhibit No. 30 was made up by me entirely without regard to what the company might have done in the past in the way of setting up reserves. The plaintiff's casualty reserve was first established prior to 1912 and was for the company as a whole. The amounts actually set aside by the Pacific Gas and Electric Company for its entire system covering damage and accident claims and the expenses of the claims department were \$57,000.00 in 1913, \$91,000.00 in 1914, \$96,000.00 in 1915, and \$96,000.00 in 1916. Those sums were given to us by the Vice-President and Treasurer as the amounts to be set up. The amounts set aside for this reserve were intended merely to cover probable annual losses. There was no attempt to build up a reserve against large future losses.

The total payroll of the company for all purposes is about \$6,000,000.00 per annum. The total cost of labor included in operating expense for the San Francisco gas department for the year 1915-16 was \$732,415.79. These amounts are not comparable, however, as the former includes the cost of construction labor.

The witness being recalled by the plaintiff testified in substance as follows:

1100 I have prepared a statement showing a segregation of the Pacific Gas and Electric Company's total labor cost included in expense of operation and maintenance and the cost of labor included in expense of operation and maintenance in its San Francisco gas department, and the ratios between these amounts.

A true copy of this statement which was admitted in evidence and marked plaintiff's Exhibit No. 34 is as follows:

Period.	Total system labor— maintenance, and operation.	San Francisco gas labor department as per Exhibit No. 30, casualty insurance basis.	Percent- age S. F. gas dept. labor to total system labor.
Year July 1, 1912, to June 30, 1913.....	\$3,372,083.29	\$760,627.45	22.56%
Year July 1, 1913, to June 30, 1914.....	3,398,814.94	699,234.32	20.57%
Year July 1, 1914, to June 30, 1915.....	3,473,270.69	730,372.09	21.03%
Year July 1, 1915, to June 30, 1916.....	3,555,480.43	732,415.79	20.60%
Total.....	\$13,799,649.35	\$2,922,649.65	21.18%

Mr. S. F. NORWOOD, a witness called for the plaintiff, testified substantially as follows:

I am 31 years of age and have lived in San Francisco since March, 1913, coming here from Los Angeles where I resided one year. I received my education at the Baltimore City College and afterwards studied three years at the University of Maryland.

Then I went into the casualty insurance business and have been engaged in that line ever since 1908. I have occupied various positions, such as home office adjuster, field special agent underwriter, and practically every other position in the casualty insurance business.

Since coming to California I have been a special agent, doing casualty underwriting in Los Angeles for a year. I have been with the London & Lancashire Indemnity Company in San Francisco since 1913. I am the Resident Secretary of that company and have charge of the casualty and surety department under Manager Story. I have served for more than one year on the Rating Committee of the California Inspection Rating Bureau, which is a bureau to promulgate rates under the minimum rate law. Under what is known as the minimum rate law, the Insurance Commission of the State of California has authority to regulate minimum rates for Workmen's Compensation Insurance. The California Inspection Rating Bureau was formed by the casualty insurance companies and the California Industrial Accident Commission for the purpose of co-operating with the Insurance Commissioner in the enforcement of that law.

I am acquainted with the rates that have been in force and charged by casualty insurance companies in California, particularly in San Francisco since 1913, and in Los Angeles during the year 1912. During the year commencing July, 1912, and ending June 30, 1913, the rate regularly charged by casualty insurance companies, for insurance against casualties, covering office labor, was eleven cents per \$100.00 of payroll, with a limit of \$5,000.00 for one person and \$10,000.00 for one accident. The rate or premium for plant and distribution labor for gas companies was \$3.50 per \$100.00 of payroll for insurance covering only employer's liability and carrying the same limit. The public rate, i. e., the rate for insurance covering liability to others than employees, under the classification "gas work and maintenance" was \$4.50 per hundred dollars of payroll. That made the total rate for insurance against liability to employees and public \$8.00 for every hundred dollars of payroll.

In brief, the rate for office labor is eleven cents on each hundred dollars of payroll and the compound rate for insurance against liability to employees and the public based on the payroll of the labor employed in maintenance and operation of the plant is \$8.00 per hundred dollars of the payroll. The rates remained the same until December 31, 1913. In January, 1914, the rate on workmen's compensation insurance, clerical, was raised to sixteen cents per hundred dollars. From January 1 to December 31, 1914, the rate for the labor employed in the maintenance and operation of gas plants was

\$2.25 and on public liability was \$2.00 instead of \$4.50 as in the preceding period, making a total rate of \$4.25. During the period from January 1, to June 30, 1915, the rate on clerical labor was eleven cents and the rate on plant and distribution labor (workmen's compensation) was \$1.98. The public rate was the same as the preceding period, i. e. \$2.00.

On cross-examination the witness testified in substance as follows:

In the past approximately 40% of rates charged by insurance companies have been carried as a load for overhead charges. This 40% is made up of (a) acquisition expense, which includes branch office expenses, salaries, operation and maintenance of the branch office, or of a commission paid to the General Agent; the commissions on employer's liability run approximately 25% of the total premium; and (b) auditing, payrolls and accounting and all other expenses not properly chargeable to the actual procuring of the business. Investigation and adjustment of losses could probably be charged up to the same 40%.

I do not know whether a company insuring itself would have to charge the 40% loading charge. There might be a difference of result by reason of the difference between a hazard founded on one payroll and a hazard founded on all the payrolls that concern a casualty company's business. In the case of the company carrying its own insurance, the overhead would be less, but I don't know how much.

1104 The promulgation of casualty rates is now on almost as scientific a basis as fire insurance rates and casualty rates are based on experience of companies operating all over the United States. There is a national bureau which tabulates and furnishes information, and establishes basic rates.

The insurance bureau here makes an independent study of the hazards in California. California rates are not basic rates, they are differential rates.

The past experience of a company would be a valuable factor in determining what amount should be set aside for casualty insurance. The condition of a plant and the care exercised in its operation are important factors.

A company might allow its reserve to grow above the actual losses to insure against catastrophe hazard. Of course, if the fund grew indefinitely it might become larger than the company. Any employer insuring with the State Compensation Fund during 1914, 1915 and 1916 has received a rebate of 15% on the stated rates.

Reductions of rates are usually based upon experience or competition or new knowledge.

On redirect examination the witness testified in substance as follows:

The efforts that employers have made all over the country under the slogan of "Safety First" have had a tendency to reduce rates by improving plant conditions.

1105 Mr. FREDERICK C. GRIMSHAW, recalled as a witness for the defendants, testified in substance as follows:

I have compiled from the books of account of the plaintiff and its predecessor, the San Francisco Gas and Electric Company, a statement showing the charges and credits to a reserve provided for the purpose of covering losses occasioned by casualties during the calendar years 1909, 1910 and 1911, and also during the period from April 1, 1913, to June 30, 1916. During the period from December 31, 1908, to November 27, 1911, the San Francisco Gas and Electric Company maintained a separate casualty insurance reserve.

During the period from November 27, 1911, to April 1, 1913, the Pacific Gas and Electric Company maintained a combined insurance reserve account in which were included casualty, fire and boiler insurance. During the last mentioned period of time, according to the information furnished to me by the representative of that company, the charges for casualties in its San Francisco gas department were small and were charged directly to operating expenses.

During the period from April 1, 1913, to June 30, 1916, the Pacific Gas and Electric Company maintained a casualty insurance reserve covering its entire system. For the purposes of this statement, I have apportioned the entire amounts appropriated by the Pacific Gas and Electric Company to its casualty insurance reserve
1106 between its San Francisco gas department and its other departments on the basis of the losses incurred in those departments respectively.

The charges against and credits to the casualty insurance reserve shown by the books of the San Francisco Gas and Electric Company from December 31, 1908, to November 27, 1911, are as follows:

	Charges against reserve gas dept.	Reserve allotment gas dept.
December 31, 1908.....		\$30,000.00
January 1st—December 31st, 1909..	\$19,929.65	30,000.00
January 1st—December 31st, 1910..	8,776.90	30,158.90
January 1st—November 27th, 1911..	1,990.53	27,500.00
	<hr/>	<hr/>
	\$30,697.08	\$117,658.90

On the basis of the apportionment which I have already mentioned, the charges against and the credits to the Pacific Gas and Electric Company's casualty insurance reserve for its San Francisco gas department during the period from April 1, 1913, to June 30, 1916, are as follows:

	Charges against S. F. gas dist. reserve,	Proportion of reserve allotted S. F. gas dist.
April 1st, 1913—June 30th, 1913....	\$2,039.26	\$4,601.21
July 1st, 1913—June 30th, 1914....	15,558.57	11,609.40
July 1st, 1914—June 30th, 1915....	5,446.96	7,097.39
July 1st, 1915—June 30th, 1916....	10,527.95	11,433.60
	<hr/> \$33,572.74	<hr/> \$34,741.60

1107 The statement prepared by Mr. Grimshaw with respect to the aforesaid casualty insurance reserves was admitted in evidence and marked defendants' Exhibit No. 90. The only part of that exhibit which is essential to an understanding of the matters involved on plaintiff's appeals in these cases is the statement of charges and credits to casualty insurance reserve which are copied above as a part of Mr. Grimshaw's testimony.

On cross-examination, Mr. Grimshaw testified that he had not ascertained the amount of pending claims against the Pacific Gas and Electric Company arising out of casualties and that the statement prepared by him (defendants' Exhibit No. 90) merely showed the actual charges and credits affecting the casualty insurance reserve.

1108 Mr. WILLIAM LESLIE, a witness called for the defendants, testified in substance as follows:

I am Secretary-Actuary of the State Compensation Insurance Fund and have filled that position since October 1st, 1913. My duties are to supervise the underwriting and office work, and to keep the statistics for rate making purposes, to assist and advise the Insurance Commissioner in the promulgation of rates under the uniform rating statute. As a representative of the fund, I am a member of the Classification & Rating Committee of the Workmen's Local Rating Bureau, which advises the insurance commissioner with regard to the making of rates in California.

Before occupying my present position I was Actuary for the Reliance Life Insurance Company in Pittsburgh. I am a University of California graduate and while in college studied insurance lines. Later I took the examinations of the Actuarial Society of which I am an associate. I am a fellow of the Casualty Actuary Statistical Society.

I have examined the rate schedules set forth in plaintiff's Exhibit No. 30 and find that the rates stated there for the period after January 1, 1914, correspond with the rates charged by the State Compensation Fund since January 1, 1914. Prior to that time the rates shown are those that were usually charged under the Rosebury Compensation Insurance Act. Forty per cent. of those rates represented the loading for overhead expense and acquisition of business for 1913, 1914 and 1915, and 37½% for 1916. Employers insuring during years subsequent to January 1, 1914, with the State Compen-

sation Fund have received rebates on their insurance premiums. The average refund declared in 1914 on earned premiums was 15%. There was another 15% refund in 1915 and the same in 1916. The refunds for 1915 and 1916 were apportioned to each employer in accordance with his loss ratio, but it was only an average of 15% that was declared, some employers getting less than 15% and some more than 15%.

According to our experience, with the gas risks insured by us in 1915, employers would have received a 17½% refund on their premiums for insurance.

The law as it originally stood required an average of 4½ years that the reserves must be maintained, the reserves being 75% of the earned premiums, less losses and expenses actually paid. At the last session of the legislature the law was amended to provide for an average reserve period of 3½ years. The percentage of the earned premium for reserve was reduced from 75% to 70%. That permits us at the end of this year to release the reserves which we put up on December 1, 1913 because they will have been in force 3½ years on an average.

Referring to Exhibit 30, P. 10, under the heading of "Office Labor," the 16¢ rate is for Compensation Insurance for the period from July to December 1914, and the 11¢ rate applied from January to June 1915. Under the heading of "Plant & Distribution Labor" the compensation rate from July to December, 1914 was \$2.25 and the public liability rate \$2.00. For the period from January to June, 1915, the compensation rate was \$1.98 and the public liability rate was \$2.00. Under the heading of "Office Labor" on Page 6, the rates given are for compensation and not for public liability. Under the heading of "Plant & Distribution Labor," from the period from July to December 1913 the rate for compensation was \$3.50 and the rate for public liability \$4.50.

With respect to the years shown on Page 14 the rates under the heading of "Office Labor" are for compensation exclusively. The rates under the heading of "Plant & Distribution Labor" for the period July to December, 1915 are \$1.98 for Compensation and \$2.00 for public liability. For the period from January to June, 1916 they are \$1.98 for compensation and \$2.00 for public liability.

If a company controlled all of the gas business, with the exception of one or two smaller companies, probably the losses of the individual company would correspond with the losses in the gas business in the district as a whole. It would, of course, depend entirely upon the size of the company and the extent of its operations as to whether there would be that dependability and stability of losses.

If the company had a very large pay roll there might be a practical equality of hazard as applied to the district although as an insurance man I am very reluctant to admit that any single company could be absolutely certain of its experience to the extent that it would say that it would or would not have a definite loss ratio. There is always a chance in the insurance business which cannot be eliminated unless payroll exposure is very large. It is generally

1111 better to have insurance business distributed among different classifications in order to secure stability because what might affect one classification one year would not affect the other classification in the same year. Taking different classifications together produces a better and more stable mass than one industry alone, even though it is very extensive in size.

The element of catastrophe is the biggest element to consider. The ordinary small losses, minor accidents and accidents involving serious injury to only one person are things that can be measured more certainly than possible catastrophies which when they happen are very, very costly. The possibility of the catastrophe depends very largely on the character of the business. In some businesses the possibility is very slight.

On cross-examination the witness testified in substance as follows:

The rates for each industry are based on the idea that they will produce a sufficient premium to meet the losses of that industry. So far as an individual company in writing business is concerned, it would probably not confine itself to writing risks of one kind because it would feel that there would not be the average distribution of hazard as if it wrote a great many risks of many different kinds. The factor of 40% overhead applies on the total premium. The rate is built up by deriving what is known as a pure premium which taken as a percentage of the payroll will just produce enough in money to pay the losses which will occur without any contribution
1112 to the expense of carrying on the business. The actual rate which is charged is a rate, 60% of which will produce this pure premium cost, and 40% of which will be available as a fund to pay all expenses incidental to the business.

During the period spoken of in my direct examination the rate that was in effect by state authority was also charged by the Casualty Companies although there was no compulsion on any carrier to actually charge those rates.

There is no private company which is actually returning dividends to its policy holders. There is one mutual concern which is an inter-indemnity exchange, organized locally under the statute permitting that sort of insurance carrier to write compensation business. It operates on a mutual basis and returns dividends to its policy holders.

The State is permitted to pay commissions, but does not in actual practice. So far as other overhead charges are concerned, it theoretically has the same expenses as private companies. The 40% or loading charge is purely for expenses of operation and does not pay dividends. It is assumed that dividends will be paid either out of a possible underwriting profit, which is a profit from the more favorable loss experience than the 60% provision contemplates, or that the dividends will be paid out of interest earnings of the invested assets, which constitute the premium collections of the policy holders and the reserves which are held by the company to pay future losses, etc. The 60%, called the pure premium is the part that is intended

to be sufficient to cover the losses. There may be adjustment if the estimate happens to be a little high or a little low.

1113 I don't know the experience of the Pacific Gas & Electric Company during the years July 1st, 1913 to June 30, 1916 and could not say whether the ratio of loss was high or low and consequently am not in a position to tell whether if it had insured with the State Fund, its refund would have been 15% or less than 15% or more than 15%. Under the present plan every one is entitled to a 10% refund irrespective of loss ratio.

1114 Mr. N. RANDALL ELLIS, a witness called on behalf of the defendant, having qualified as a valuation engineer, testified in substance as follows:

Casualty Insurance.

Defendant's Exhibit No. 90, page 1, shows the following payments for accidents and damages in the San Francisco gas district from January 1, 1909, to June 30, 1916.

Jan. 1—Dec. 31, 1909	\$19,929.65
“ “ 1910	8,776.90
“ Nov. 27, 1911	1,990.53
Jan. 1, '12—April 1, '13 (Charges small and included in operating expenses)	
April 1/13—June 30/13	2,039.26
July 1/13—June 30/14	15,558.57
July 1/14—June 30/15	5,446.96
July 1/15—June 30/16	10,527.95

\$64,269.82

Period $7\frac{1}{2}$ years, average per year \$8,569.00.

The following table, defendants' Exhibit No. 90, page 1, shows the annual amounts set up by the company for the entire system for the years in controversy, and the proportion allocated to San Francisco gas district on the basis of charges against the fund, as determined by the city's Auditor.

	Reserve allotment entire system.	Proportion of reserve allotment allocated to S. F. gas district.
April 1/13—June 30/13	\$73,996.54	\$4,601.21
July 1/13—June 30/14	66,000.00	11,609.40
July 1/14—June 30/15	101,500.00	7,097.39
July 1/15—June 30/16	96,000.00	11,433.60

1115 In view of the experience of the company over a period of $7\frac{1}{2}$ years, showing an average annual expenditure of \$8,569.00, and also after considering the proportion of the company's

annual allotment to total system reserve, which would be allocated to the San Francisco gas district, I am of the opinion that an annual allowance of \$15,000.00 for accident, damage and casualties would be ample and I have allowed such sum for each of the years in question.

In this connection I might state that during the period from 1908 to November, 1911, when the San Francisco Gas Department set up a separate reserve, such reserves accumulated a surplus of \$86,961.00, which at the time of the merger was transferred to "Corporation Surplus."

The Workmen's Compensation Act went into effect on the first of January, 1914. In considering the three years in question, i. e. from July 1, 1913, to June 30, 1916, the experience of the company during the past 7½ years and its present procedure in setting up reserve funds are the governing influences with me and I have assumed a flat \$15,000.00 for each of the years in question, giving no consideration to the workings of the Compensation Act. The reason for the large expenditure in 1909 was that in that year a large sum was paid for damage caused by a gas explosion.

The following table shows the company's claim for Casualty Insurance as set forth in Exhibit No. 30. Applying a 40% reduction, representing overhead expense, to these amounts, we have the following:

1116	Company's figures.	Same less 40%.
1913-14.....	\$29,414.01	\$17,648.41
1914-15.....	19,965.38	11,979.23
1915-16.....	19,103.57	11,462.14

The average of those would be about \$14,000.00.

On cross-examination the witness testified in substance as follows:

In my direct examination I stated the conclusion that a certain annual amount would be a sufficient allowance to cover actual losses suffered by the plaintiff in this case in connection with its gas properties and business in San Francisco, that amount being considerably less than the company would have had to pay in premiums to secure the insurance. If the Company had insured with outside concerns, I would consider it poor judgment, and if it had incurred large expenses by so doing I do not think they would have been recognized by any rate fixing bodies.

I am not sufficiently familiar with the insurance business to state the underlying theory or principle upon which insurance companies make their rates. I have made no particular study of the basis of casualty insurance rates, nor am I entirely familiar with rates outside of certain specified occupations. I have not been testifying as an expert on casualty insurance. I took the record of the companies' losses and then deducted 40% and rounded it up to \$15,000 a year. I had no information as to the cases and claims

1117 pending or casualties that have occurred during the period in litigation.

I would not say that the fact that 100 men were insured and no accidents occurred demonstrated that the insurance was of no value.

I presume the general underlying principle of insurance is that the premiums are based on probabilities but are intended primarily as compensation for the risk assumed. I think the question of whether a company is entitled to compensation for carrying its own insurance is a question of equities.

1118 C. Cost of automobile insurance.

Mr. WALTER D. SULTAN, a witness called for the plaintiff, testified in substance as follows:

I am 30 years of age, and reside in San Francisco. At present I am employed as a valuation engineer in the auditing department of the Pacific Gas and Electric Company. I have occupied that position since the early part of 1913. Before that I was with the J. G. White & Co. for about a year and a half engaged in valuation work and prior to that I was with the Abner Doble Company in hydro-electric construction work. I graduated, in 1908, in the College of Electrical Engineering in the University of California.

I have compiled a statement of the automobiles of the Pacific Gas and Electric Company that are used either wholly or partly in its gas department. This statement includes all machines directly used in the gas department and those that are used in a general way by both the gas and electric departments. I have included the machines that were in use June 30, 1914, and listed in Mr. Jones' inventory (Exhibit No. 3). I have also shown the machines that were in use before and after that date.

This statement was admitted in evidence and marked plaintiff's Exhibit No. 33.

Page 1 of Exhibit No. 33 contains a summary showing the total amount of premiums which the plaintiff would have had to pay for insurance against theft, fire, collision, transportation, property damage and public liability for each of the four years from July 1, 1912, to June 30, 1916, if it had insured its automobiles with insurance companies. The remaining pages contain an itemized list of the different machines owned by the company and used in the San Francisco gas department. The machines that are used partly in the gas department and partly in other departments have been prorated in this exhibit (No. 33) to the gas department on the same basis that Mr. Vincent used in making his general apportionment of our all-department capital between the gas department and other departments. This statement also shows the actual cost of each automobile listed herein and when it was put into service. The Pacific Gas and Electric Company does not carry any automobile insurance with insurance companies. The premiums shown here are such as we are informed the insurance companies would charge.

The figures representing the insurance premiums in this exhibit (No. 33) were obtained from Mr. Alfred E. Webber of the Firemen's Fund Insurance Company. We gave him the data contained in this exhibit; and from such data he computed an insurance value for each machine and then computed the various amounts making up these premiums.

According to the best of my information and belief, this statement is correct. The computations indicated therein were made under my direction. A true copy of page 1 of Exhibit No. 33 is 1120 as follows:

Premium for Insurance Against Theft, Fire, Collision, Transportation, Property Damage and Public Liability.

Year July 1, 1912, to June 30, 1913.....	\$4,594.39
Year July 1, 1913, to June 30, 1914.....	4,173.35
Year July 1, 1914, to June 30, 1915.....	4,670.43
Year July 1, 1915, to June 30, 1916.....	5,467.77

On cross-examination the witness testified in substance as follows:

The plaintiff has not carried any insurance on its automobiles. The company has not actually set up any separate reserve on its books for automobile insurance. When a loss occurs in connection with the plaintiff's automobiles, it is charged either to fire insurance reserve or casualty insurance reserve. I do not know what the actual losses through automobiles have been during the time covered by this exhibit (No. 33) nor do I know the general practice of companies having a large number of machines as to carrying automobile insurance.

1121 Mr. ALFRED E. WEBBER, a witness called for the plaintiff, having qualified as an expert with reference to automobile insurance rates, testified in substance as follows:

I am special agent of the automobile department of the Firemen's Fund Insurance Company and have occupied that position for nine years past. My present duties are to supervise the automobile insurance which comes into our office both from San Francisco and outside points. This includes the supervision of the issuance of policies and the determination of the rates to be charged.

There is a body known as the Pacific Coast Automobile Underwriters' Conference, the functions of which are to disseminate information to its members for the proper underwriting of automobile insurance, to establish the proper rates, policy forms, etc. I have been a member of the Rates Committee of that Conference for several years. This Committee attends to compiling proper rates, subject to the approval of the conference. The basis for determining proper rates is the experience of the various companies writing automobile insurance. Data and figures are received showing the losses in the various sections, the quality and quantity of losses.

The cars are divided up into different sections according to the value of the car, its horse-power and make. All of these things enter into making rates.

Before taking charge of automobile insurance for the Firemen's Fund Insurance Company, I was with them for about ten years in the fire underwriting branch.

1122 Our Pacific Coast Department received last year in net premiums approximately \$400,000.00 for automobile insurance.

I have had submitted to me a list of the automobiles of the Pacific Gas and Electric Company used in San Francisco in connection with its gas business. I have made a study of the list and the different kinds of automobiles there for the purpose of determining what would be the premiums charged by our company for insuring those machines. There is a difference in the rates according to whether insurance is given against fire, theft, collision, transportation, property damage and public liability. The list of automobiles submitted to me by the plaintiff is the same as the list which is included in its Exhibit No. 33. We first established what we thought was a fair insurable value for each of those cars and then figured the amount of the fire, theft and transportation premiums, the collision premium, the property damage premium and the public liability premium. The premiums which were figured by me are those which Mr. Sultan has used in Exhibit No. 33. The premiums shown in Exhibit No. 33 are those which would have been charged, during the period indicated, by the Firemen's Fund Insurance Company, if application had been made to it for the insurance of the aforesaid machines.

We have one class of cars which are entitled to what we term a special rate, namely, cars which are used for commercial purposes. Any fleet which has at least five commercial type cars in it is entitled to a special rate for fire, and theft. The premiums in Exhibit No. 33 were not based on that rate.

On cross-examination the witness testified in substance as follows:

All of the cars of the Pacific Gas and Electric Company, if there had been at least five vehicles of the commercial type (trucks), could have been given benefit of the special rate. But I do not see that number of such cars in any of these lists. There is a great deal of competition in the automobile insurance business. The usual commission paid to agents is 15%. In Oakland, Berkeley and Alameda, and some towns in the northwest, we pay 20%. In San Francisco the commission is 15%.

I don't know what allowance is made in the rates to cover overhead charges. Automobile insurance is still in an experimental stage. My company has been in this branch of the business about ten years. Our expense last year, which included everything having to do with the securing of the business, salaries, overhead, and operating expenses was about 45% of our premiums and our losses totalled about 47%.

In granting the commercial rate to a company, we operate under a regular schedule from which we cannot deviate in making
1124 up the rate. There is no flat deduction from the schedule or anything of that sort.

N. B.—The subject of annual allowances for fire, casualty and automobile insurance reserves is treated by the Master on pages 103 to 106 of his report.



Vol. II

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, [REDACTED] 1923

No. [REDACTED] 34

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO.

No. [REDACTED] 35

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

No. [REDACTED] 36

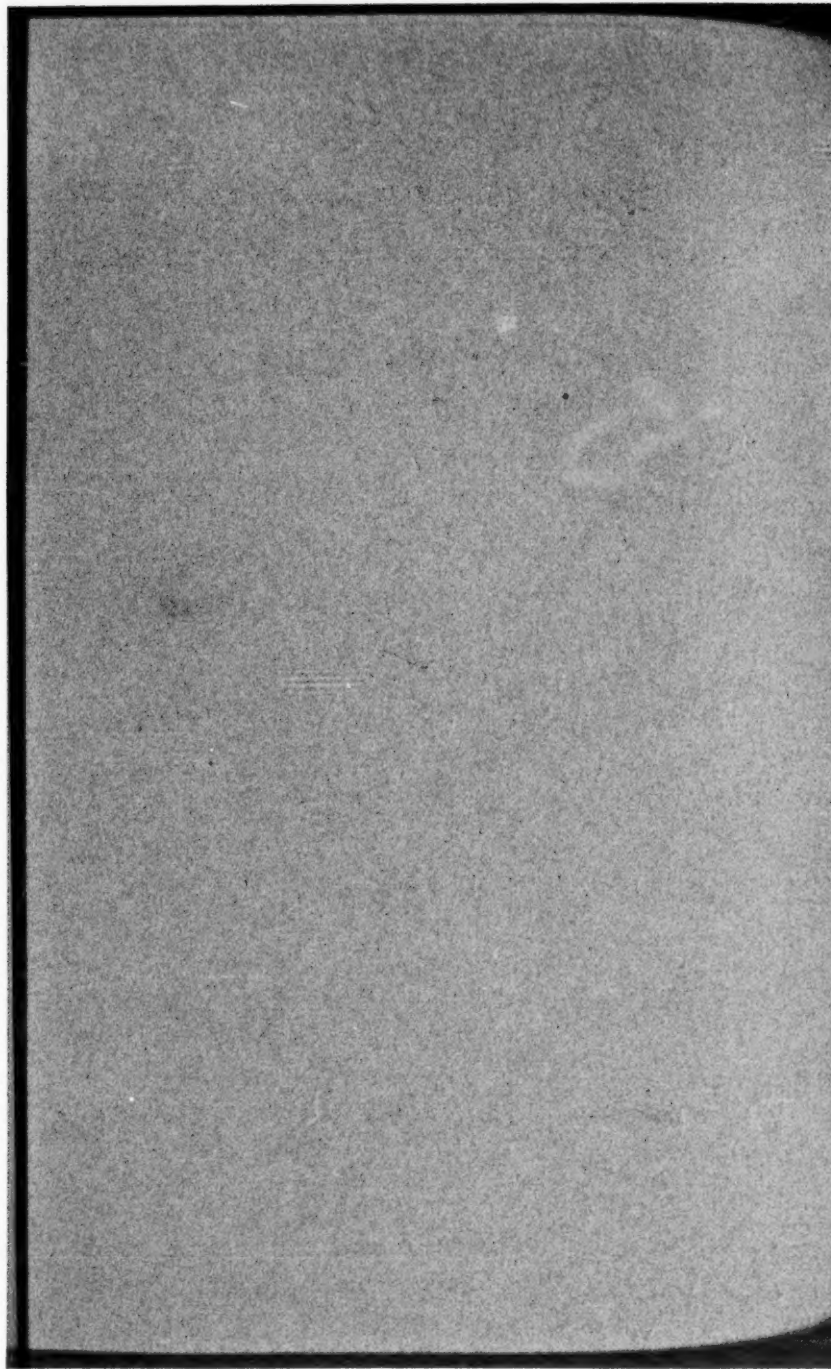
PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE NORTHERN DISTRICT OF CALIFORNIA.

FILED APRIL 15, 1923.



(28,830, 28,831, 28,832)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1922.

No. 331.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO.

No. 332.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

No. 333.

PACIFIC GAS & ELECTRIC COMPANY, APPELLANT,

vs.

CITY AND COUNTY OF SAN FRANCISCO AND JAMES
ROLPH, JR., MAYOR OF SAID CITY AND COUNTY.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE NORTHERN DISTRICT OF CALIFORNIA.

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PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, et al., Defendants and Respondents.

VOLUME II.

1125

SUBDIVISION IV.

Evidence Relating to Accruing Depreciation and Annual Allowances Therefor.

A. General principles—The relation of depreciation to the rate base and provision for replacements.

1126 Mr. C. E. GRUNSKY, a witness called on behalf of plaintiff testified as follows:

I was born in San Joaquin County on April 4, 1855. I am a graduate of the Stockton High School. After graduating I was a teacher in that school for a year. I then went to Europe and took a course in civil engineering at the Polytechnic Institute at Stuttgart, Germany, and graduated from there in 1877. From 1878 to 1888 I was in the State Engineering Department of California—first as topographer, then as an assistant in charge of office computations, and later the chief assistant of that department. From 1889 to 1890 I was a member of the State Commission on Rivers and Harbors in California. In 1892 and 1893 I was a member of the Sewerage Commission of San Francisco. In 1894 and 1895 I was consulting engineer to the Commissioner of Public Works of California, at that time concerned with the flood control and drainage problems, particularly in the Sacramento Valley. From 1900 to 1904 I was City Engineer of San Francisco. In 1904 I was made a member of the Isthmian Canal Commission by appointment of President Roosevelt. From 1905 to 1907 I was Consulting Engineer in the United States Reclamation Service and Adviser to the Secretary of the Interior. I have at various times been engineer for irrigation districts and have had considerable private experience. I was in private practice at Sacramento and in San Francisco from 1888 to 1900. I am now and have been since 1890 a resident of San Francisco. In the course of my private experience I have had some work to do in the

1127 matter of valuing property owned by public service corporations. The first experience in that line which I recollect was

in connection with the valuation of the property of W. H. Howard, which the Spring Valley Water Works was desirous of obtaining for reservoir purposes. In 1892 I was employed by Drinkhouse on the valuation of reservoir land that was required by the Spring Valley Water Works in connection with its Crystal Springs Reservoir. In 1893 I was employed by the San Diego Water Works and made a valuation of its water properties in connection with its rate case. In 1894 I made a valuation of the Benicia Water Works. While City Engineer from 1900 to 1904 I made valuations of the Spring Valley Water Works property as a basis for rate fixing. In 1906 I appeared as a witness for the City and County of San Francisco, on the subject of valuation, in the Spring Valley Water Works rate case. In 1911 I was employed by the San Francisco Gas & Electric Company in connection with the valuation of its properties used by it in the manufacture and distribution of gas. In 1914 I was again consulted on the valuation of the properties of the Pacific Gas & Electric Company used in the generation and distribution of electric energy in San Francisco. I was a witness on the valuation of reservoir lands in the Spring Valley Water Company's rate case in 1915. In the early part of this year I was engaged on similar matters, with reference to the East Bay Water Company's rate case before the Railroad Commission. I am a member of the American Society of Civil Engineers, of the Pacific Association of Consulting Engineers
1128 and of the California Academy of Sciences. Among my contributions to literature on the rate regulation of public utilities are the following:

The appraisal of public service properties as a basis for the regulation of rates, in the Transactions of the American Society of Civil Engineers, 1912.

Depreciation as an element of consideration in the appraisal of public service properties, Transactions of the American Society of Civil Engineers, 1915.

Valuation, Depreciation and Rate Base, a book published by Wiley & Sons, in 1917.

At the present time I am in private practice in San Francisco as a consulting engineer and as President of the American Engineering Corporation. I am engaged on irrigation and other work of like character, and also on matters relating to valuation. My studies have extended to economics as well as to engineering matters. I have endeavored to deal with questions relating to the valuation of public utilities both from an engineering point of view and from the point of view of economics.

Mr. Bosley:

Q. Mr. Grunsky, will you now state to the court your views with reference to what should be deemed to be the proper rate base and the manner of treating the replacement requirements in the case of public utilities.

A. In replying to that question I will make rather an extended statement.

1129 It may well be demanded of every public utility that the service rendered shall at all times conform to an established standard. The value of the service rendered does not depend, in other words, upon the age or remaining years of usefulness of the plant or of any of the various articles which go to make up the plant. In most cases the quality of the service improves with age. Experience, under conditions of actual operation, results in overcoming early difficulties. The service may become more dependable after some years of operation than it was while the plant was new. Confidence in the same grows as time rolls on; consequently, if other things are the same or equivalent, the public would prefer to have the service rendered by a well maintained mature plant than by a new plant. There is no reason, therefore, why the service rendered by a plant which has already acquired some age should be valued and paid for at any other rate or on any other basis than would be the case if the service were rendered by a new plant. It follows that the determination of rates, the determination of annual net earnings should not be predicated upon the present value of the elements which go to make up a public utility plant.

1130 The earnings of every public utility should be sufficient to meet operating expenses; to yield a fair return on the invested capital—interest plus profit; to provide for renewals or replacements, or, as an alternative, to provide for the temporary or permanent retirement of capital.

The question may arise, when rates are to be regulated, what portion of the earnings should be construed as reaching the owner for the particular purpose of creating a fund which is to be used for renewals or replacements or which, in certain cases and under another interpretation of its purpose, may be regarded as the retirement of a part of the owner's capital.

Until within recent years the general practice has been to allow the public utilities to earn first, interest on their investments, usually represented in large part by a bonded indebtedness; second, a profit covered in the dividends paid to stockholders, and third, operating expenses, including the annual replacement or renewal requirements. Under this plan of procedure there was ordinarily no admitted return to the owner of any part of his capital. If dividends were large, this was attributed to a large increment of profit. If dividends were small, the stockholders looked forward to an increased volume of business and some profit in the future.

The rate-fixing authorities since their advent have generally favored a procedure under which accrued depreciation is regarded as having been actually earned and placed in the hands of the owner of the utility as a return of a part of his capital, thereby effecting a reduction of his investment.

Theoretically, for every \$100 invested in any article used as a part of a utility plant, the owner should receive in addition to operating expenses when the cost of money is 6 per cent:

1131

Interest on \$100 at 6% (plus profit)	\$6.00+
A replacement increment estimated by the sinking fund method which for articles of the 10 year life class at 6% would be on \$100	7.59
Total	\$13.59

The annual replacement increments, thus computed, if actually earned and placed at interest, will, in the 10 years of the assumed life of the article, amount to \$100, being the sum then necessary to effect a renewal of the article.

The owner must, in other words, in some way (as by interest on invested fund) get more than the bare replacement increments as estimated by the sinking fund method, if within the probable life term of any article he is to be placed in position to renew that article without loss.

If the annual replacement increment, computed by the sinking fund method, is actually covered by the earnings (receipts from rate payers), in addition to a fair rate of return, i. e., in addition to interest and profit, it will make no difference whether the owner holds the same in a fund until required to make the renewal or whether he otherwise disposes of the same. The money thus received and interest thereon is dead money for any purpose other than to replace or renew the article at the proper time.

If a replacement fund is not actually created its non-existence will not relieve the owner from his obligation to replace the article.

1132 If, however, the earnings have not been adequate to create the fund or to bring it up to the full amount which should be in it, then the owner will have made an additional sacrifice. His earnings have been deficient. His investment has been increased.

When a single article is under consideration, an article of such magnitude or importance, if it be a part of a public utility plant that it receives consideration by itself, the replacement fund earnings—not to be confused with the income resulting from rates—will increase from nothing or a very small amount in the first year to a considerable amount in the last years of the article's life. These replacement fund interest earnings, when added to the replacement increment estimated by the sinking fund method, will for any year amount to the amortization increment as the same would be estimated by the compound interest method.

If it happens that at the beginning of operation the demand for the services is light and earnings fall short of meeting the replacement requirement estimated by the sinking fund method, then there will be various ways of proceeding to make good the early deficiency. A simple procedure will be to provide for raising the renewal fund required to retire any article, during the remaining years of the article's life. Another procedure is to add the deficiency to the rate-base because it represents a sacrifice which the owner has made to establish the business, and may therefore be treated the same as any other investment.

In the case of a complex plant the necessity of individualizing the articles of which it is composed disappears. Articles which have the same probable life term when new may all be considered together and average conditions are to be taken into account.

1133 In such a case it can be shown that the interest on what should be in a replacement fund, together with an average aggregate annual replacement allowance, estimated by the sinking fund method, will be in accordance with the actual average annual replacement requirement, which for a plant long in service, will be determinable by the straight line method.

The natural way of conducting the affairs of a public utility would be to allow the investment to remain undisturbed in its entirety, unless the public desires to become part owner, and to make a reasonable provision for meeting replacements as these become necessary. For individualized articles the time should be forecast when the article will have to be replaced. More or less of a fund may be accumulated to avoid embarrassment when the time for replacement arrives. In the case of extensive complex utility plants, the replacement requirements will be small in the early years and as the plant acquires age they will gradually increase to about the amount which would be determined by the straight line method. The entire property should be treated as though its life were not limited. Under such a procedure the basis of the calculation when rates are to be fixed, would be a natural rate-base, being determined from investment without deduction for accrued depreciation and there would be an annual allowance for replacements instead of for what is commonly called current depreciation. There is no amortization of capital. This procedure I have named the "Unlimited Life Method."

1134 It is essentially a replacement method, but with average annual requirements used in the calculation instead of the actual requirements of each individual year. Under this method there will be no occasion for holding a large balance in a replacement fund. There should, however, be enough to insure the renewal of property as it may become necessary. Under any less favorable situation the property might suffer from deferred maintenance, which would result in impairment of the service.

Q. Will you explain what you mean by "deferred maintenance"?

A. By deferred maintenance I mean neglect; that is, such neglect as is evidenced by not keeping the property in ordinary repair.

Q. In other words, by "deferred maintenance" you mean maintenance that is deferred beyond the time when it should have been made?

A. Yes, that is what I mean, and it refers particularly to the ordinary class of repairs; or if property has been kept in use longer than it should have been used, so that the property is not in perfect operating condition, as measured by its own standard.

Q. I wanted to bring that out, because we had used the term deferred maintenance in another part of the testimony of this case in a different sense; that is, as being the equivalent of accrued depreciation. You may now proceed with your statement.

A. (Continuing:) The question arises whether, in the absence of

a depreciation fund in the full theoretical amount, and in the absence of book evidence that the earnings were in part diverted into such a fund, it would be proper to assume, even when there has otherwise been a fair return, that there has been any retirement of capital.

The fund is essential, as has been explained, to supplement with its interest earnings the sinking fund allowance for replacement
1135 ments. The fund, even when it has been established in adequate amount, is not therefore to be regarded as having amortized capital, except only in case that the rates produce sufficient revenue to meet the actual replacement requirements unaided by interest on the fund.

When there is no fund, and the replacement allowance is estimated by the sinking fund method, the obligation of the owner is to make good the deficiency between the actual replacement requirements and the inadequate replacement allowance. A certain amount of his outside capital not appearing as investment in the utility equal to the amount that should have accumulated in a replacement fund will be dead capital for any other use than to supplement the replacement allowance. The owner will, under such circumstances, be in the position of having had no capital returned and of having to sacrifice additional capital for the upkeep of the utility. The accrued depreciation in such circumstances is a matter entirely apart and throws no light upon what should be used as a rate-base.

As a general proposition it would be unfair to the owner of any complex utility property, when no accumulation in a replacement fund can be shown, to assume that, because of some accrued depreciation, he has actually received back a part of his investment. It would be unfair to assume, when the earnings have covered only a fair return on the investment, plus annual maintenance and upkeep requirements, plus operating expenses, that there was an unexpressed intent to let a part of the return be applied to retire capital. As a
1136 matter of fact, if the rate of return on the investment in such a case was but fair, there could have been no retirement of capital.

Unless there be good evidence to the contrary, it should be assumed that public utilities generally have been operating on the plan of obtaining a fair return (including profit) on the capital invested and of making provision out of earnings for operating expenses and renewals and that there has been no provision made for amortization of capital—

Mr. Searls: I object to that statement as being obviously the statement of a conclusion of law by the witness; it is a matter for the court to decide, and not for the witness.

The Master: Well, it is quite a familiar state of facts, Mr. Searls; the witness is advising the court, and I have no objection to his doing so.

Mr. Searls: The witness is advising the court to assume as a matter of law what the court is not bound to assume, to-wit, that the burden is on the defendant to prove there was nothing in the past, instead of being on the plaintiff to prove it.

The Master: Well, you need not worry about that, Mr. Searls; I will formally overrule the objection.

A. (Continuing:) To make no provision for the retirement of capital would obviously be the sensible procedure for any new plant, because, thereunder, during the early years of operation when the rate-payers are fewest in number the requirement for replacements or renewals will be small and the required earnings will be less than in later years when parts of the plant show the effect of wear and tear and have to be replaced.

1137 Only when actually earned amortization increments can be traced, is the element of uncertainty, relating to the retirement of capital, removed.

This statement has special reference to a complex plant of the nature of an ordinary utility. It requires, perhaps, some modification when a utility is under consideration such as a transportation business with only a single unit in service, as for example a steamboat. In such a case it is hardly conceivable that even though not classified as amortization of capital, or depreciation, the increment of earnings necessary to retire the steamboat in its probable life term would be overlooked or would not be readily traceable.

It follows that in the case of every complex public utility which has acquired a fair age, either there should be an adequate replacement fund already accumulated practically as an offset to the accrued depreciation or the entire investment without deduction of accrued depreciation should bring a fair return and the earnings should in addition cover fully the actual annual replacement requirements.

The owner of such a utility is therefore entitled to a full consideration of all circumstances relating to the investments which he has made. It is not enough to show that funds have actually been available out of earnings with which to make renewals or with which to offset discarded or abandoned property. Unless it can be shown that in addition to the necessary allowances for renewals and abandoned property, the owner has actually received back a part of his capital, he will remain entitled to a fair rate of return on the full amount which has been legitimately put into the enterprise.

1138 Not only, therefore, should the rate-base or that amount to which the fair rate of return is to be applied, be determined from the legitimate investment, undiminished by depreciation, but the earnings should cover an allowance for the annual replacement or renewal requirements not based on an estimate of theoretical depreciation by the sinking fund method, but based on due consideration of the fact that as a plant grows old, the annual demand for renewals or replacements of articles in any class will ultimately be in inverse ratio to the number of years which new articles in that class are expected to serve. In an old plant which has long ago reached its full development, this ultimate condition will prevail. In a plant which is no longer new and in which the annual betterments and extensions are relatively small, this condition will be

approximated. In a new plant, on the other hand, the annual replacement requirements might for a time be only nominal.

Owners of public utilities are in the business of serving the public with the expectation of being compensated for management, of making a profit. If the prospect were not favorable for a return on investments in public utilities in excess of a fair interest return on the invested capital, there would be no inducement to take the hazards which are incidental to public service enterprises. These enterprises usually involve relatively large investments to meet both the present and the prospective needs of the community which is to be served, and they must usually be conducted for a time at a loss. Every utility, the necessity of whose existence is established, has contributed in some degree to the general prosperity of the community which it serves. Consequently the owner of the utility should in a fair measure be allowed to share in this prosperity. He is entitled, in other words, to a fair profit, to a return in excess of interest on his invested capital, which is what he looked forward to when he undertook the enterprise. If by reason of favorable circumstances he has escaped losses due to human frailty and other causes, and if by efficient management he has made a profit, this fact by itself cannot be accepted as proof that a part of his capital has been paid back. All circumstances relating to each case must be brought under review before, in such event, the conclusion would be justified that there has been any return of capital to the owner.

Generally speaking, therefore, when a utility which has been long in service, but which has not been operating under a restricted franchise, or under rate regulation by competent authority, is brought under review, and the rate of return is so fixed as to include profit, the conclusion is justified as already stated:

First, that a natural rate-base undiminished by accrued depreciation should be used, which is usually best determined from the estimated cost of reproduction, including a proper allowance for the cost of establishing the business, and checked if possible by cost-records, and that to this rate-base the fair rate of return should be applied.

Second, that the replacement allowance (so-called current depreciation) should be equal to the average annual requirement for replacements or renewals.

Third, that suitable provision should be made for the amortization of capital invested in property which has to be abandoned because of obsolescence or which is lost by fortuitous events.

1140 I might also state that when public utility properties are owned by corporations that the ownership in the stock is constantly changing, and that the relation which the present stockholder bears to the corporation may be somewhat different from that which was borne to the corporation by the stockholders at some time in its history when it may have made large profit.

Mr. Bosley:

Q. Mr. Grunsky, will you now state your opinion with reference to the proper method of treating obsolescence in connection with the operation of public utilities, in the management of their operations?

A. With reference to obsolescence as affecting the rates to be charged by public utilities I would make the following statement.

An appliance, machinery or a process of manufacture in use by a public utility may under efficient management at any time be superseded by a better device or process. When this is the case more or less property is usually discarded, which, under the conditions as they prevailed when this property first came into use, should have served for many years longer. Obsolescence has forced its abandonment.

The knowledge that obsolescence may shorten the term of usefulness of a machine or of portions of any plant used in the public service has prompted valuation experts and the rate regulating authorities to attempt estimates of the allowances which should be made in the earnings to cover the prospective abandonment of property due to this cause.

1141 The last word has not been said in the discovery of new forces in nature and their adaptation to human requirements. It is the belief of many engineers, for example, that the internal combustion engine will put the old types of marine engines of ocean freighters on the scrap heap, and yet the older type under gradual development to its present high state of efficiency had maintained itself for more than a hundred years.

The use of oil in place of coal, not alone as a producer of gas but also as fuel in the production of steam, has caused appliances and machinery to be abandoned which would otherwise have been continued in service. No one today can be sure which of two extremes is most likely to prove true, whether, for example, the last word has been said in the manufacture of gas and there will be no further abandonment of standard gas making appliances and processes, or whether, due to exhaustion of sources of oil, or due to other causes, there may not be some new substitute for oil or for the gas itself found which will render some of the most modern appliances of the day obsolete in the near future.

Past experience in the matter of abandonment of property, due to obsolescence, is not a dependable guide to what may happen in the future. In this respect there is a difference between the failures from this cause and those which result from the wear and tear of use and from the somewhat less regular failures through accidents incident to human frailty, fire and similar causes. In the one case the basis for a satisfactory prediction is lacking. In the other the probability of events occurring in the future can be predi-

1142 cated with some confidence upon what has occurred in the past. There is a difference too, between replacements made as the result of obsolescence and replacements due to failure from other causes. In the case of obsolescence the replacement is made with some device which betters the service—the output costs less,

or the service is made more reliable or the quality of the output is improved while in the case of ordinary replacements or renewals the betterment of service is not a necessary incident.

It is proper to charge the rate payer with the cost of replacement when property fails from ordinary causes and to let the earnings, therefore, cover a replacement increment during the useful life of any item of property and to base the charge on the ordinary replacement requirement as determined for such property,—

Mr. Searls: It is understood, your Honor, that my objection goes to all of this line of testimony, as to the statement of the witness as to what he believes to be proper or equitable.

The Master: Oh, yes.

A. (Continuing:) Not so, however, in the case of obsolescence. This will be made plain by the following considerations.

There would be no obsolescence if the improved machinery or the new process which takes the place of that which is being replaced did not result in some advantage to someone—

Mr. Bosley: Pardon me for the interruption for just a moment, Mr. Grunsky. With reference to the use of such terms as "equitable" and "proper," I think Mr. Grunsky is using those as expressing his opinion as to what he believes to be fair and right from the point of view of an economist, and that it is not intended
1143 as the expression of any opinion upon a point of law.

Q. That is the fact, is it not, Mr. Grunsky?

A. Yes, that is true.

If the obsolete property were treated as though its failure had been correctly foreseen and as though funds for its replacement had already been collected from the rate-payers and if the owner had not in fact collected sufficient funds, and if thereupon the remaining value of the obsolete property or the capital investment at which it was carried in the rate-base were immediately ignored, and rates were established as though the abandoned property had never been in use, the rate payer would at once get the full benefit of the innovation and the owner would have made a sacrifice of capital which he could perhaps have avoided by being a less efficient manager and holding to the older less efficient plan of operation. Let it be known that the usual procedure will be to forecast failures by obsolescence and to amortize the capital in such properties on the basis of assumed average conditions which means inadequate amortization in many cases, and there will no longer be any inducement to the owner to improve the efficiency of his plant. He will conclude that it will be safest not to use new inventions or to introduce new processes so long as a sacrifice of capital is thereby involved. He might, in making an innovation, find that he had on his hands abandoned property, the cost of which has not only not been fully returned to him but concerning the further amortization of which the established rules of rate regulating bodies may give no adequate assurance.

1144 It seems self-evident that when the introduction of a new invention, whether the same applies to a machine or to a process, reduces the cost of operation, the resulting advantage should go to both the owner of the utility and the rate payer. But it is also true that in such event there will be no hardship imposed on the rate payer if the benefit of reduced cost of producing the output does not come to him immediately. A reasonable procedure would therefore be, in all such cases, to allow the rates to remain as they would have been without the new process, at least long enough to amortize so much of the original plant as is thereby rendered useless, unless a reduction would result in increased demand and greater net profit to the owner, and, thereafter, to so adjust rates that, for a suitable period of time, the benefit of the reduced cost will be shared on a fair basis by the owner and the rate payer. Any treatment less favorable to the owner of a public utility would discourage the introduction of innovations if they involve further investment of capital and would make for inefficient rather than for efficient management. The owner must not be expected to consent to an increase of hazard without an increase of profit.

The practice of attempting to foresee obsolescence and of burdening the rate payer before the failure by obsolescence with the charge that is necessary to amortize the capital which obsolescence renders useless, is not alone unwise but unjust. It is not fair to the rate payer because those who pay rates before the betterment is made should not be made to pay for the advantage which will come to those who pay rates after the betterment has been made; it is not fair to the owner because while apparently increasing his earnings it will act, as do all high charges for service, as a deterrent

1145 upon the extension of business and because there will be cases where by error in the estimate of time allowance for obsolescence the owner will be called upon to make a sacrifice when due to obsolescence property is abandoned, which cannot be offset against the advantages that may come to the owners of other utilities who benefit by an allowance for something which, in their case, never happens. The obsolescence will, in many cases, occur before any adequate provision has, in fact, been made.

To illustrate the problem which is presented when one type of machinery is replaced by a better type, let it be assumed that the machinery of an old style generating station has been replaced by steam turbo generators, that the old machinery had been in use for some years, that it was still in first class condition but that its abandonment was advisable because, all factors being taken into account, the generation of electric energy will be cheaper with the new installation.

Suppose that the remaining or present value of the abandoned machinery, as a part of the utility, was \$200,000 (original cost \$250,000 less \$50,000 earned replacement) and that \$75,000 was realized from its sale after abandonment. Suppose further that an appraisal of the new machinery after its installation shows that it should be introduced into the rate-base at \$150,000.

Two cases are possible, either the \$50,000 of earned replacement

increments have actually been returned to the owner and have reduced the remaining investment from the original \$250,000 to \$200,000, or the \$50,000 are carried in a replacement fund. In

the first case on the assumption that only property in use is 1146 carried in the rate-base, there would be, after the new machinery is installed, a value to be taken into account reduced by the \$200,000 and increased by the cost of the new machinery; that is, \$150,000 less the sale value of the old, or \$150,000—\$75,000=\$75,000. The result would be a net reduction of present value, as appearing in the rate base of \$125,000. The amount, on some theory other than "present value," could be retained in the rate base subject to amortization, or it could be transferred to profit and loss or some other account where it would be carried until together with interest thereon it is completely wiped out. In the second case the old machinery would have been carried in the rate base, at the time of its obsolescence, at \$250,000, the original cost, undiminished by accrued depreciation, but this amount would have been offset in part by the \$50,000 in the replacement fund. By the transfer of this sum the \$250,000 would be reduced to \$200,000 and there would then be an addition of the net cost of the new machinery or \$75,000. The rate base would include on account of both old and new machinery an amount of \$275,000 which is \$125,000 in excess of what should be in it if original investment in property in use is the determining factor. In either event there will be \$125,000 to be either carried indefinitely in the rate base or to be amortized within a reasonable time.

Unless the owner felt reasonably certain that the \$125,000 would be returned to him in some way, he would not prematurely discard the old machinery.

Mr. Bosley:

Q. What do you mean by "prematurely"?

A. I mean by that at such a time that there would be a material loss resulting from the amount at which the new machinery 1147 is carried in the rating base, being less than the old, not being returned to him; so long as that was material to him, I would call it a loss.

Q. Perhaps it could be put this way: That the owner, under those conditions, would be disposed to use his old apparatus until it became necessary to replace it by reason of its wearing out, until he could reach a point where he would either have to replace the old apparatus with new apparatus of the same kind, or with new apparatus of a different kind, he would be disposed to do that before making the change, would he not?

A. Yes, that is what I mean by the use of the term "prematurely," that if he were not sure that he would be protected, as I have explained, he would continue the old machinery in use until the earnings he has made with the old machinery would fully compensate him for having maintained it in use, or until, through ordinary causes, it had worn out and is no longer serviceable.

Q. So that he could abandon it without incurring a loss?

A. Yes.

If as a result of the change rates are reduced to a point excluding interest on and amortization of the \$125,000 the owner will have made a sacrifice for the benefit of the rate payer out of all reason. If, however, the rates remain undisturbed for a time, then, during this time the excess of earnings, over operating expenses, will be larger than it had been under the original plan of operation by the amount that the cost of operation has been cut down. This increase of net earnings, perhaps cut down somewhat by voluntary action of the owner, should be used to amortize the \$125,000
1148 and interest thereon, and when this is accomplished a reduction in rates would naturally ensue, and the rate payer would share in the benefit resulting from the reduced cost of operation.

Q. That finishes your statement with reference to the treatment of obsolescence, does it, Mr. Grunsky?

A. Yes.

Q. I would like to ask your opinion in this connection, as to whether there is an analogy between the case of losses due to abandonment or discarding of property because of its obsolescence and abandonment or discarding of property which is no longer necessary for use as a result of the consolidation of two or more companies? Assume that there are two or more competing companies operating in the same field, and that upon their being consolidated, it is found economically advantageous to discontinue the use of a part of the operating property, in order that the works may be operated as a consolidated plant, should the value of the property, the use of which is abandoned in the interest of more economical and efficient operation, be treated in a manner similar to obsolescence, or in a manner similar to depreciation of property due to wear and tear?

A. I should say that in a case of that kind the facts in the case should be taken into account. There is some analogy, and while it is supposed that when a consolidation is effected, that by reason of a simplification of management and more efficient management,
1149 the rate payer should get some benefit, there may also be duplication to such an extent that it should not be fully amortized for the benefit of the owner. I want to qualify that, though, by saying that the public is responsible for the duplication, the public should not permit competition that will result in duplication that will make the construction of unnecessary appliances and parts of plant possible. Therefore, the benefit which the rate payer gets when the consolidation is effected might very well go in part, at least, toward the amortization of property which is abandoned by reason of the consolidation.

Q. If you take the circumstances where as the result of competitive conditions encouraged and favored by law the consolidation takes place resulting in economies, and if by availing itself of the economies effected by the consolidation, the new owner, owning all of the property, should amortize the property which he found caused him unnecessary duplication, it would be preferable to treat the loss

occasioned by the abandonment of the duplicated property in the same way as you treat obsolescence, rather than to accumulate a fund in advance and provide for its abandonment, would it not?

A. I should say that in most cases that would be true.

Q. Also in this connection, we have the case of the abandonment of property due to the inadequacy of parts of the manufacturing plant or distribution system. In your judgment, how should the losses occasioned by the abandonment of property because of inadequacy be treated?

1150 A. Inadequacy results from the fact that a community or parts of a community grow more rapidly, and the demand for the output becomes greater than has been foreseen. The property in use has to be abandoned before the term of probable life that was originally assigned to it has expired. If the growth of a community is phenomenal and that abandonment due to inadequacy occurs prematurely, such property would fall into a class that is very akin to that that is abandoned by reason of obsolescence. As the growth of communities can generally be forecast on the basis of past experience, the attempt has generally been to include inadequacy with the other causes that lead to the abandonment of various articles connected with a public utility plant. I can imagine cases where inadequacy should be treated just as obsolescence should be treated, while there will be other cases where inadequacy should be taken into account in forecasting the probable time of service, and determining what the charge upon the rate payers should be for consuming each article during its life. I would, therefore, divide inadequacy into two classes, the one being the ordinary and the other the exceptional.

Q. Inadequacy, then, occupies a position between the deterioration due to use and wear and abandonment or loss of property due to changes made necessary by advance in the arts?

A. As a general statement, I should say that is true.

Q. In some instances, it ought to be classed with one and in some instances with the other?

1151 A. Yes.

Q. Now, Mr. Grunsky, will you give us your opinion concerning the way in which losses of property occasioned by casualties and contingencies which are of so abnormal a character that insurance is not readily obtained as a means of protection against them—how these losses should be treated? I might say how non-insurable losses occasioned by extraordinary casualties should be treated in this problem of determining what rates are properly to be allowed in the regulation of public utilities.

Mr. Dailey: What do you mean by "non-insurable?"

Mr. Bosley: I mean those for which insurance may not be had under the existing conditions; either that no insurance is to be obtained because there is nobody engaged in the business of insurance against such risks, or because if insurance could be had against such risks it would be on terms that would be financially prohibitive.

A. On that subject I would say that losses by fortuitous events as affecting the rates to be charged by public utilities, losses of mag-

nitide which result from floods, earthquakes, volcanic eruptions and the like, and in general, losses against which the owner cannot insure, belong to a class of sacrifices, which like those due to obsolescence should be made good to the owner of the utility after the event, by the public, that is to say, by the rate payers. Such losses cannot be forecast. They should not fall entirely on the owner of the utility.

1152 In some fashion and to a fair extent, they should, in the course of time, be amortized out of earnings. As a rule no provision for other than ordinary risks is made in the allowed rate of return. Consequently, after a catastrophe, for which the owner is not responsible, but which entails a large investment of new capital to rehabilitate a public utility plant, there should be some provision for amortizing the loss. It will, in such event, be better to let the amortization take place within a reasonable time rather than to carry an equivalent sum in the rate base as though it were a permanent though unproductive interest-bearing investment.

It will perhaps be claimed, by some, that such losses should not be differentiated from the ordinary losses due to unforeseen causes, and that whatever hazard is involved in any enterprise has unqualifiedly been assumed by the owner of the utility. Under such a theory the allowance for hazard should at all times be liberal enough to compensate the owner for the chance which he takes of at some time suffering material loss. He would be compelled to take the gambler's chance and the rate payer should stand the higher rate. Under such a practice there would be an owner here and there who would suffer large loss, while the great majority of owners, escaping the great catastrophes, would get what really should be paid, in the exceptional case, to the unfortunate owner. Under such a treatment of this matter, the tax for the risk would fall upon those who are paying rates

1153 before a catastrophe occurs, as well as upon those who receive service from the rehabilitated works. The more logical procedure would be to relieve the rate payers from the burden of making the inadequate provision for catastrophies which may never occur and letting the loss that actually results from a catastrophe be met out of future earnings. The usual provision for meeting losses which result from such fortuitous events as are here under discussion, is inadequate. The owner does not, as in the case of losses which must be made good by assurance companies, get the full benefit of the allowance for risk which is distributed in small measure or is at least supposed to be distributed among all public utility owners and is supposed to be collected in the earnings. The owner's share in this risk allowance is only a proportionate one while the loss, when it occurs, cannot be distributed to the other utilities of the country which escape such loss, but falls in its entirety upon the one utility that may be affected thereby.

In recognition of the fact that most utilities escape such losses, the usual allowance in the public utility rates for the element of risk is small and probably in most cases negligible. The allowance for management, for business hazards, together with the allowance for participation in the general prosperity of the country, in short

the profit allowance, would probably in few, if any cases, be materially reduced, if this element of risk were entirely eliminated.

In all cases in which this interpretation of the present day procedure is substantially true, it would be unfair to an owner whose public utility plant sustains material damage by flood, by earthquake or by other fortuitous event, against which insurance is im-

1154 possible, to let the entire loss fall upon him without recourse. That such losses should in some way ultimately fall upon those who are served by the utility seems self-evident. The most equitable procedure would be to let them be borne by the rate-payers before the event as well as by the rate-payers of the future. But as they cannot be foreseen the practical alternative would seem to be to let them fall in the main, or in their entirety, upon the rate-payers of the future as would be the case if the utility were publicly and not privately owned.

In the case of a business not subject to regulation the opportunity to make up for past losses exists if larger profits can be made by charging what the traffic will bear. Owners of public utilities should be allowed to recoup their losses, if they can do so without charging rates unreasonably high.

1155 Cross-examination:

This is a general statement applying to the properties of the Pacific Gas and Electric Company in San Francisco. In 1911 I made an appraisal of those properties and I familiarized myself very thoroughly with them at that time. I made a study of those properties in a general way while I was city engineer before 1911, but I did not make any appraisal of them. I think that these principles should prevail in determining the rating base for the San Francisco Gas Department of the Pacific Gas and Electric Company. I think that the rate regulating authorities should apply principles substantially as I have laid them down here. I know that the courts pay attention to value because they are interested in whether rates are a confiscatory nature or not. I think these principles should govern both in the fixing of rates and in determining the adequacy of rates which have already been fixed. "Value" as ordinarily used in rate cases is the worth in exchange. Value to me has practically only one meaning, it is the worth at which an article is taken in exchange. It is practically synonymous with market value. New meanings have been given to the word "value" when it is made the rate base in a rate case. If I were held down to the decisions of the

1156 courts and were attempting to make value the starting point, value might be different in a rate-fixing case from what value is ordinarily. I do not want to be understood as saying that some article like a steamboat that has served one-half of its term of usefulness is worth as much as a new steamboat. I do not want to say that the purchaser of a steamboat business would pay to the present owner of that steamboat business 100% of the cost of a new steamboat, if the steamboat that he is buying has served one-half of its term, even though that steamboat would carry as much freight and would not require an appreciably greater amount of maintenance

expenditure than before. But if with that steamboat there went what should be in a depreciation fund so that that fund, together with the steamboat, would make up the full original investment in the steamboat, he could probably pay 100% for that steamboat. If the depreciation fund had been invested in replacing worn-out parts in the past, he would not get the value of the boat because it would always be an old steamboat with a less number of years to live than a new steamboat. In the case of a gas works you have a complex

property made up of a great many different items. Some of
 1157 them are so large they can be individualized and dealt with separately; a great many of them are of such a character that they are lost among a multitude of other articles. In the case of the steamboat you have what might be called a single unit that is gradually approaching the end of the term of its usefulness.

Mr. Searls: Let us assume that you have a purchaser who desires to make an investment in gas works and that there are two gas works that he has under contemplation; they are in two cities of about the same population and have about the same general character of plants; in one case the city is new and the plant has been in operation for a comparatively short period of time, in the other the plant has lived about 50% or more of the ordinary useful life of its structure; is it your opinion that the purchaser would pay the same amount for the plant in the one case as he would in the other, other things being equal?

A. It would depend upon the earnings. It would depend upon the regulation to which these gas works are subject.

If we assumed that they are subject to the same regulation by the same commission I would have to ask the question as to
 1158 whether the interest allowance that the owner will get is estimated upon the money invested in the enterprise less accrued depreciation, or whether it is based on the original investment in the property or the cost of reproducing the property: In other words, whether the net earnings in the two cases are the same or not. The real test of value is the capitalization of the net earnings. If those net earnings are assured by regulation or otherwise, value can be determined. If we assume that the property has been well maintained, that the operating efficiency is equal in both cases, that the actual net earnings for the past 5 or 6 years have been approximately the same and that the condition of regulation is the same for both plants, the value in the two cases would be the same, that is, the prospective purchaser would be willing to pay the same amount because the true test of value is the capitalization of net earnings, both present and prospective. I would take into account all factors respecting earnings, the prospective growth of the community and the increase resulting from that and other causes. The reason that I make a distinction in the case of the steamboat is that I consider that apart. If the boat were sold with the business, with
 1159 a guarantee of proper net return at all times, the business including the depreciation fund, assumed to exist, would be worth 100% at all times, and there would be no difference in

circumstances, would you think that the plant which was going to obsolesce, due to a change in the art, would be worth as much as the plant which was adapted already to the change in the art, with perhaps an equal physical condition?

A. To the extent that an additional sacrifice would have to be made for the plant that is not up to date, it would have a disadvantage.

1164 An element to be taken into account in fixing the value of a plant is, how much it would cost to take the water gas generator and convert it into a modern oil gas generator, which would have to be deducted from the price asked for the plant.

Q. Now, let us take another element: Supposing you found that, due to the very excessive competition in the past, there were a large number of mains in these streets, which were not necessary as a matter of economical operation, and if it were a question of figuring the cost of putting in a substitutional plant instead of that, that it could be done for very much less money, do you think that would have any effect on the value?

A. I think it would have an effect on the value, but it might still leave the question open as to whether the owner of that system containing duplicated works should not be entitled to an amortization of some of the investment that was made in the property that has become useless. That would be another question. That would be a question of fair treatment. It might be that it would be a question of what the rate making body might do to a person after he bought it, and to that extent he would have to take into consideration the personnel of the rate making body, and other elements. That would be taken into account as one of the risks in his purchase, and he would have to consider the thing as a business proposition, as to how much that affected the value of the existing plant.

Mr. Bosley: Mr. Searls, I can see that you are now almost around to my position, that the question of value is ultimately one of judgment, and that it varies according to many circumstances.

1165 Mr. Searls: I have not got to the point of capitalizing the Railroad Commission or the Federal Court yet, but I concede that anybody, buying any business, is going to look into that as one of the factors. I don't know whether he would capitalize it or not.

Q. As a matter of fact, in applying this question of duplication to the present situation in San Francisco, Mr. Grunsky, are you prepared to say whether or not that would be a factor seriously affecting the value which would be paid for the gas plant of the Pacific Gas & Electric Company?

A. It would be taken into account by a prospective purchaser, that is, if you mean by that, in comparison with the total investment. I mean by the phrase "taken into account" that the question of the efficiency of rendering the service would be taken into account. There may be two mains in a street and still the requirements of that street be not over-fulfilled.

Mr. Searls: I am assuming by "duplication," a number of mains in excess of those which are economically required for the operation

of the plant. I don't mean by that just the capacity required to-day, but with reasonable provision for the future.

A. (Continuing:) In valuing a property that has such duplication, of course, that fact would be taken into account. I know there was some duplication in San Francisco. I know there was
 1166 some excess capacity in some of the streets in San Francisco. I could not tell you to what extent. This duplication arose chiefly through the result of competition. I should call it needless competition and the public should never have allowed it.

In 1901 I made a report with reference to the cost of constructing a municipal gas plant.

Mr. Searls:

Q. It is a report, dated November 30, 1901, signed "C. E. Grunsky, City Engineer." In that report you state:

"Based upon the statements filed with the Board of Supervisors by the several corporations which are furnishing gas to the city, it appears that their plants represent a combined investment of about \$14,700,000, and are claimed to have a present value of about \$12,400,000."

Then you go on and estimate the cost of a municipal system to furnish equivalent service, and you reach a total sum of \$5,200,000. I ask you to look over that report and see whether any modification should be made in the statement which I just made?

1167 A. I think that in explanation of the statements that were read by Mr. Searls from the report which I made under date of November 30, 1901, and which was submitted to the supervisors by the Board of Public Works, under date of February 25, 1902, that the entire report should go into the record, because it explains what it was proposed to do at that time. If I have not overlooked anything, the rated capacity of the works was about 8,000,000 cubic feet per day. This was a coal gas plant which, if it had been constructed, would have served but a comparatively short time. It included the construction of 64 full depth benches.

Q. In that connection, I call your attention, Mr. Grunsky, to your statement on page 484:

"There being three private companies in the business of supplying gas, operating to a large extent in common territory, there is considerable duplication of works to be noted, particularly in the matter of distributing mains. This may hereafter become true to a much greater extent if the plans of the Independent Gas Company be carried out, which has taken the first steps toward the construction of gas works of large capacity for the distribution of gas to all parts of the city."

And then again:

"Or the assumption that municipal gas works would be required to supply all light for the streets in fairly well built up sections of

the city, and that the municipal works would entirely replace the private companies, they should have a rated capacity of at least 8,000,000 cubic feet per day. The works, as projected, will have this capacity, besides some reserve."

A. Yes, and then the result is given as bringing up the total capacity to 9,500,000 cubic feet per day. I am not sure, though, that the total estimated investment would have produced a plant giving that entire capacity. There should be also read in connection with this report, the report of Richard Fenner, Gas Engineer, which was made to me, he having acted as my assistant in this matter. He was not an assistant engineer at the time he made said report. He was employed for this special purpose.

Mr. Grunsky: I would like to state, in explanation of the proposed capacity of the plant—I get a little more information by reading from Mr. Fenner's report on page 487:

"It is proposed to generate both coal gas and water gas, the coal gas plant to have a rated capacity of 2,000,000 cubic feet of gas per day and the water gas generators a capacity of 6,000,000 cubic feet per day. This plant will have ample capacity for the immediate needs of San Francisco and will, if required, permit the production of gas without undue forcing of the plant to the extent of about 9,000,000 cubic feet of gas per day. The rated capacity, as above noted, is considerably less than the capacity at which the works, as shown on the plans herewith submitted, can be efficiently operated."

By "works" I mean the gas works for which the estimate was being made.

Mr. Searls:

Q. Mr. Grunsky, if, as is stated in that report, a plant capable of producing an amount of gas equivalent to the amount which was being produced by the three competing plants at that time could be built for \$5,200,000, whereas the book value of the competing plants was something like \$14,000,000, if your theory of amortizing the results of the competition for which you say the public is responsible should be carried out, the rate payers for the time subsequent to 1901 would be under the obligation of amortizing something like \$9,000,000 in excess of the equivalent value of the works then in existence, would they not?

A. In equity that is true. A condition might exist where the public should assume that and should amortize property of that kind. Taking it as an economic proposition, I don't know that it would be correct in every case, and perhaps in this case, to throw the entire amount upon the public.

Q. And if the company which bought and consolidated these competing plants did not see fit to write off a large portion of them until eight or ten years afterwards, in your opinion, do you think

that was an element which should be considered by the rate makers of 12 or 14 years afterwards, in determining rates for the future?

A. I think that items of that kind, property that has actually been consumed in the business, is sometimes carried for a very long period of time. I don't know that the matter of time should cut any material figure there. I would not carry it so far as to say, that the rate payer of to-day, if it turns out that somebody 20, 30 or 50 years ago made a mistake, should, as a matter of sound economics, be required either to amortize or capitalize that mistake and pay a return on it, because I feel that the owners of these properties change, the stockholders of these properties change, and there should be some consideration given to the time at which the public benefits by the various things that take place in connection with public utilities. Since 1901 the ownership of all the gas plants in the city has been practically completely changed. There has been a consolidation.

There have been several new ones constructed, and they have 1171 been consolidated. It is also true that the entire management of the plants have changed—the personnel.

In connection with the abandonment of property that results from consolidation, I think I stated or attempted to state that there is usually a benefit that comes to the rate payer caused by reason of the consolidation, one management being substituted for several, costs of operation may be reduced, and without charging excessive rates, that is, still keeping rates reasonable, without any increase, but rather with some decrease in rates, it will be possible to amortize some of that property which has been thus abandoned. The extent to which it should be amortized, I don't think I stated, at least I didn't intend to, because losses of that kind may have to fall upon the owner as a part of the risk which he assumes when he goes into the business, as well as upon the rate payer. I thought I stated it in about that form.

Mr. Searls:

Q. You might have this situation, might you not, where in the early stages of rate regulation the regulation part of it was a matter of name rather than of fact. The companies were permitted to charge pretty much what they cared to. If the rates under such regulation got too high, competition would be invited by the high rates, and the result would be a period of competition and perhaps a reduction of rates below the point which should be economically adopted?

1172 A. I can imagine such a condition. I also know that the gas business under our California laws which permitted anybody to go into the business that chose to—invited competition. It is so easy to find a restricted territory where a few miles of mains will command a large number of consumers, that the cream of the business can very readily be taken from the established company. Competition has been invited in that way. I imagine that the rates the company charged in all cases have been reasonable rates, or fairly reasonable, even when they were perhaps what would be called high. The opportunity to get a large number of consumers

within a small territory invited all the competition in San Francisco that existed in the first year or two of this century and during the latter part of the '90's. The rates were profitable and were less than the rates which the established companies charged in connection with their entire business scattered through the entire limits of the city. The rates were fixed according to a classification of use, a subdivision of the aggregate earnings from certain classes of consumers.

The percentage of leakage from the mains which would
 1173 cause a lower or higher loss of gas would be an element which would be considered by an intelligent purchaser.

If the leakage should be about $1\frac{1}{2}$ times the normal, it would affect the operating cost, because more gas would have to be manufactured in such a plant, and, therefore, of course, the net earnings would be less at the same rates for the output. In my report, the leakage was estimated at 10% which is probably a little less than normal. In San Francisco—I presume it has been brought out in this case—there have been times when the leakage has been very greatly in excess of that amount, due to earthquake causes.

Q. I understood you to say at one point in your testimony that if the company carries funds for depreciation or amortization, it should only charge against those funds the items for which they were carried; in other words, if a company carried a reserve for depreciation which was in excess of the average annual replacements and physical losses, that might very well be held for obsolescence and depreciation factors of that sort, but they should not
 1174 go declaring dividends out of it or using it for other purposes than that for which it was set aside.

A. A fund of that kind can be used for almost any purpose, such as making replacements or betterments, and investing it otherwise in the improvement of the plant, so long as the fund is properly accounted for. I would not wipe a fund out merely because it has been put in additions and betterments, provided it is properly carried on the books, and the earnings of the fund are properly estimated and allowed, so that the earnings of the fund together with the new money that goes into the replacement fund will be adequate to make replacements when required.

If the fund was estimated on the basis of requirements for obsolescence, inadequacy and depreciation, and a large portion of the plant was wiped out by fire or earthquake, the losses resulting from such a catastrophe should be charged up to that fund. The fund would be depleted to that extent, but would be restored. It would be equivalent to apportioning funds for renewal or for new construction. If the company took the fund and used it for items that were not contemplated in its estimate, the fund, for a time, would be earning no interest, and the rates would have to be larger.

1175 A fund of that kind might be used or diverted to any use in connection with the public utility. I think it is purely a matter of accounting, because if the fund is wiped out the responsibility still exists. I take it that the obligation to replace is upon the owners of the public utility, and whether there is a fund

out of which the replacement can be made, or whether new capital must be put in to make that replacement, the obligation to replace is upon the owner. Now, the question as to whether the owner will be properly compensated for making an additional sacrifice is another question. It is a question of whether or not rate regulation has been properly exercised. It is not sound public utility financing for the owner to simply write off the entire fund and have no depreciation fund. He is entitled to have that fund restored to him. What I mean is that he may use it temporarily for that purpose. I think the obligation does not change at all, whether he uses that fund or not—with reference to obsolescence. There is only this with reference to a fund; the only value of the fund is that it safeguards the making of the replacements as they become necessary. To carry a large fund is always unwise. The following quotation is from a book that I wrote quite recently, entitled "Valuation, depreciation and rate base:"

1176 "The owner of a public utility should be held accountable for all sums collected from the rate payers for the specific purpose of making repairs and renewals. A diversion to other uses of any fund intended for this purpose is equivalent to a repayment of capital."

That is correct, but the obligation may exist. If this is repaid as capital and the amount of the investment is thereby reduced, it is replaced by an obligation to make replacements, on the part of the owner. The condition is just the same. It is only a matter of bookkeeping. So far as the actual investment of depreciation funds goes, any lawful use may be made of them. For instance, if the expenditure required working capital, it might draw on that fund for that purpose. I think that the best use that can be made of any depreciation fund is the use in the business itself, provided always that a sufficient amount of capital is kept available so there will be no embarrassment when replacements should be made, so that the property will not get in the condition of carrying a large amount of deferred maintenance; that is, maintenance which has been deferred beyond a period when it should have been provided for.

The rate base should be fixed at 100%, and value should not be made the rate base. I tried to make a clear distinction between a rate base and value. The courts have indicated that value should be made the rate base. That has been made the custom by most of the rate fixing authorities, but I hold that value is the result of earnings, and should not be made the premise, it should not be the starting point. I refer to exchange value. I don't know exactly what they mean by service value. By reading from my book entitled "Valuation, Depreciation and the Rate Base," I can make it a little more clear just what I mean by value.

"Value is the worth of anything measured by any standard of purchasing power. It is the exchange power which one commodity or service has in relation to another."

"Value in the sense of worth, estimated by any standard of purchasing power, is in the case of such properties as public utilities a result of the earning capacity. In the case of certain properties, such as highly improved residence property, a determination of value from earning capacity may not be immediately apparent, but the rental value is, nevertheless, generally there, and can be determined."

"The term 'fair value,' as used by the courts, has not yet been satisfactory interpreted, and no attempt will here be made to reconcile divergent views in relation thereto, but attention may be called to the difficulty which has been experienced by all who
1178 have attempted to make appraisements for rate-fixing purposes in reconciling the value to a purchaser with the fair value which the courts wish to have considered in fixing rates."

And again:

"The value to an investor is unhesitatingly determined from the net earnings with due regard to the hazards of the business. The value for rate-fixing purposes, as the courts say, is to be that value on which with the same regard for the hazards of the business the owner is to be allowed to earn a fair interest return. Value should be the same whether determined by a rate-fixing body or whether determined by a purchaser."

I think that is all I wish to call attention to with reference to value.

It would be entirely possible that a plant might be rendering 100% service to its consumers, and by that I mean gas of a satisfactory quality and satisfactory pressure and satisfactory as to quantity, without having its plant in anything like 100% condition from the standpoint of either physical deterioration or obsolescence.

You cannot have any plant that has acquired age in which some of its parts will not have deteriorated to some extent by reason of wear and tear. Any complex plant, like a gas plant, will
1179 have some of its parts decreasing in value from the time they are put into operation. I don't think there is any question about that at all. But the accrued depreciation does not measure the return that may have been made to the owner in the matter of a return of capital. Those are two entirely distinct and separate things. A complex plant may very well be operated on the theory of no return whatever of the capital invested, but with rates so fixed that the earnings will yield enough to make replacements as they may be necessary. How, in that event, the rating base would naturally be the properly invested capital usually determined by the cost of reproduction, or whatever is the best evidence as to capital that is properly invested in the plant.

In using the unlimited life method, no fund other than a small proportion to equalize annual replacements would be accumulated for the purpose of making replacements. I mean by that that it is not necessary to accumulate any large fund—just enough to make the replacements as they become necessary. I would measure such a replacement fund on the basis of experience—on the basis of the

predictions of life that can be made for the individualized articles, or for the various classes of articles. I would not entirely disregard the expectancy of life and go back solely to experience. When a plant has been in existence for a great many years, the actual experience, as the result of operation, is a good guide, 1180 supplemented by the knowledge of expectancies.

Intelligence should certainly be used in every such case, and if the probable life in each case had been correctly determined and a plant were old and no longer growing, the straight line method would be a method of approximating about what the requirements would be. That would be the standard that would naturally be used and that would then be checked by the record of actual expenditure.

The use I made of the term "straight line method" just now was in connection with a plant which has acquired age. I am not talking about the early years of a plant when there appear to be accumulations. I am only talking about estimating what the annual actual replacement requirement will be that will allow no surplus to go to retire capital. I am not talking about a new plant, because if you begin with a new plant and immediately set apart by the straight line method an amount to effect replacements, there will be a great excess. Now, what shall that excess be used for? You can give it back to the owner. You can allow him to take it and say that we, as the public, will become part owner with you in this property and give you back a part of your capital. That is one way in which that might be treated. That would be retirement of capital out of straight line accumulations. But if you have a plant that is 50 years old and is not growing, so that all of its parts have acquired age, then the straight line method of approximating replacement requirements will come very near giving the correct result, that is, the correct annual average requirement, provided also that a proper estimate has been placed upon the life of the individual 1181 articles. By the "straight line method," I mean that, when the probable life of any article has been determined, the amount which will be required to effect its replacement should be estimated by dividing the cost of the replacement by the number of years in that estimated probable life.

Q. If we were to say that the gas plant of the Pacific Gas & Electric Company reproduced new today would cost something like \$14,000,000, and if by making an estimate of the probable lives of the various elements you attain a composite life, we will say, of 20 years for the plant, would you undertake to estimate the annual depreciation increment by simply dividing \$14,000,000 by 20 and setting aside \$700,000 annually?

A. Not at all; that would be a wrong procedure.

Q. If you did that, you would have to depreciate the plant accordingly in consonance with the straight line method, would you not?

A. I think the word "depreciation" is used in a wrong sense usually. There is a great difference between the retirement of capital and depreciation. The retirement of capital and depreciation have

nothing to do with each other. The straight line method, if applied in a case as illustrated by Mr. Searls would immediately yield a surplus, and that would be accumulated in a fund, because at the beginning of operation there will be very little renewal of the parts for some years, the plant being assumed to be in good condition and no unusual events occurring to effect great losses or require large renewals.

When a plant is old, the straight line method is a good method of approximating what the actual, annual average requirement would be. I would apply it in this way. We are considering a
1182 property that has not been subject to regulation. An estimate is made of the cost of reproduction of that plant. That estimate is checked as well as possible by means of cost records. A conclusion is reached as to the total legitimate investment in that plant. That is the rate base, and not the value of the plant, but is made the rating base. The owner of the plant would be entitled to a proper return on that rating base, and he would also be entitled to recover annually in the earnings a sufficient surplus over ordinary operating expenses to meet the replacement requirements. Now, those replacement requirements, if this plant is an old plant, as I am assuming that it is, would be approximated by what is generally known as the straight line method; and if it is found that there is an over estimate, and that the replacement fund is growing larger than is necessary to safeguard the replacement, the rates should be cut down so as to reduce the amount of surplus. If there is a deficiency, then the earnings have not been fixed large enough. In a few words, that is the simplest method of rate regulation. I certainly would check the estimate of the straight line method with actual experience, because actual experience would be a good guide. If I found that the straight line method, when checked by the actual experience, would yield an amount very largely in excess of that, I certainly would not apply it for many years. I would hold this fund, or accumulation, as one that should be accounted for by the owner of the public utility. I would not consider it as a retirement of capital.

1183 Mr. Bosley: Mr. Grunsky is careful in stating his conclusions with reference to the straight line method, to say, that the straight line method would give approximately correct results if a correct estimate is made of the lives of the different parts of the plant. That qualification apparently runs through all his statements with reference to the straight line method.

Mr. Grunsky: Yes, it certainly does.

Mr. Bosley: If you had a really accurate determination of the lives of the different parts of the plant, and can reach an average, then unquestionably the straight line method and the making provision for your replacements as they actually were required to be made would be approximately the same. If you overestimate the amount required on the straight line method, you will find it departs widely from the requirements shown by experience.

Mr. Searls:

Q. Mr. Grunsky, how would you know whether you had estimated the lives rightly, or not?

A. The sum of human experience is the best guide we have to that, and we are always liable to err. We are just as likely to underestimate as we are to overestimate. If we have underestimated the lives of the individual parts, we will have allowed more than will actually be required. If we have overestimated the lives of the individual parts, we will have allowed too little. That is only a matter of approximation that can very readily be corrected in the course of a few years of operation.

1184 If the plant has already been in operation for many years and records have been kept showing just what expenditures have been made for replacements over that period of time, this actual experience would be the best guide to determine the annual allowance.

Q. And if you found from those records that a certain sum could be indicated as the average annual replacement charge, would you say that any estimate of straight line depreciation which did not conform approximately with that would be either too large or too small, as the case might be?

A. I should be guided by the circumstances of each case, and I would favor an allowance that would permit for some accumulation in a fund, provided always that the rates that are charged are reasonable rates and are not excessive. If, to provide for such an allowance, the rates are necessarily excessive, then the time has not yet come when the property is really a remunerative and paying property.

In my statement of replacement allowance, I would include inadequacy to a certain extent, because inadequacy can be foreseen. The rate payer should bear a part of the burden that may fall upon the rate payers of the present and of the future through inadequacy, that is, inadequacy that occurs because some part of the plant
1185 fails a little sooner than it was expected to fail. Inadequacy is the failure of some article due to the fact that the requirements become such that some other article of larger utility, larger capacity, must take the place of the article in use before the latter would have gone out of use from ordinary causes, that is, from causes other than inadequacy. That is, if you had a million foot gas holder, and it became insufficient for the community, you might have the option of building another million foot gas holder, or of substituting a two million foot gas holder for the first one and putting the latter upon the scrap heap—not because it is obsolete, but because it is no longer an adequate appliance. You might require the site upon which it stands for a larger unit. If a two million foot holder were substituted for the old one, it should be charged up as new capital and as the remaining value in the old holder would be capital that should have already been amortized and returned to the owner, and should have been foreseen as a replacement account, or, if that has occurred before the time when the owner will have received enough

in funds to replace it, there will be some abandonment of property there due to inadequacy. I would consider a portion of it, probably, as physical deterioration, and the rest of it as resulting from inadequacy. If proper provision had been made in advance, it would be possible to write that entire amount off against the depreciation reserve. In the case of a great many of the smaller articles in a complex utility, that will generally be the case.

It seems to me logical that obsolescence should be treated as something that should be borne by those who benefit by the introduction of the newer device. The newer device makes the cost of operation lower or it betters the service in some other way to the benefit of both the owner and the rate payer. The public utility owner expects fair treatment and protection against the depreciation in the value of his plant that takes place when obsolescence occurs, and, unless he has reason to expect such fair treatment, he will not make the change but will continue to operate with the old appliances. I think it would be fair to assume that a purchaser today of the old Independent plant with its water gas generator sets would not pay anything like reproduction new or reproduction less physical depreciation, because it has obsolesced. At the same time he might take into account the fact that, in the case of such obsolescence and the replacement of those sets by newer appliances, the cost of operation would be reduced and his profits would be larger if the rates could be maintained as they were theretofore. Now, if rates are cut down because the actual property in use has cost less, he may find that he has suffered a loss.

1187 Q. If he should buy that plant from the Pacific Gas & Electric Company, do you think he would be willing to pay them the reproduction value of that particular plant and take his chances on being allowed to get it back in the future, or would he not insist on writing that off to something like present value?

A. I do not think that under the present practice of rate regulation we would wish to introduce that plant at its full reproduction cost.

Q. Then, unless the Pacific Gas & Electric Company had provided already for the obsolescence of that plant, they would stand to lose the difference, would they not? Unless they had a fund which would take care of that, they would have no way of getting back the obsolesced value?

A. Yes, they would, if the cost of operation is reduced and they are allowed to benefit by that reduced cost of operation. They are in a position to profit accordingly by reason of the anticipated business in the future, and that is always taken into account in valuing property.

Q. I am assuming they are selling the plant.

A. The purchaser would take that into account.

Q. You just said he would not, under present conditions.

A. I said that he would be influenced to some extent by that situation. I doubt whether he would want to pay just as much

1188 for a plant that has some parts of it that are known to be obsolete and will have to be replaced within a year or two,

as he would for a plant that already had those parts renewed and replaced by modern appliances. I think there is a difference between the two. I think that it would depend upon circumstances whether the purchaser would be willing to pay the reproduction value of that plant, less physical depreciation, and not take off anything for the obsolescence factor. I do not think I can answer that generally. I think that if he were reasonably sure that he would be allowed to maintain his rates for some time in the future, knowing that he is going to decrease the cost of operation, that he might be willing to assume that.

If it were possible to see three or four years in advance, an increase in consumption and improvements in methods, it would be entirely unfair to the rate payer to provide in advance for obsolescence though already apparent, because you would be charging the present rate payer for the benefit that goes to the future rate payer who gets lower rates after the improvement is made. I don't think there would be any fairness in that, whatever. Whether the rate payer changes, or not, after the event, he is entitled to a different treatment than a rate payer before the event.

Q. Do you think this would be any fairer to the rate payer, 1189 to pile up all the obsolescence which has accrued for 20 or 25 years past and write it off, no matter how it occurred, whether through duplication, competition, or otherwise, and then charge that up to him as a part of the past history, with which he had nothing to do?

A. This is all based on the assumption that these changes result in betterment of service and reduction of rates, or something of that kind, that the service is more dependable, or is better, or that it costs less, and therefore that fact should be taken into account. In the case of obsolescence, it seems logical to have those that get the benefit make the contribution. In the case of duplication of work that results from a combination it is not so clear. It is always a question as to whether the owners of the utility have been at fault, or not. Each case must stand on its own merits.

The Master

Q. Will you tell me, Mr. Grunsky what was your suggestion as to the treatment of obsolescence? I recall that you stated that it should be borne after the event takes place. I think you said that it should be handled by allowing the company to retain the profits due to the substitution. Is that correct?

A. That is correct to this extent, that that retention of the increased profit would be for a time only to amortize the remaining value in the abandoned property. It need not be the entire 1190 reduction in operation expense that goes to the owner because the owner would find it to his advantage to let a part of that immediately go to the rate payer.

Q. That answers what I had in mind, because I did not see how then there would be any advantage to the rate payer in the reduction of rates such as you spoke of. I see your point as to that.

Well, it doesn't make any difference except for that reduction of rate, whether you speak of the owner retaining part of the benefits of his new invention, or whether you then say you will increase your operating expenses by setting up an obsolescence reserve on some basis.

A. The result is the same.

Mr. Searls:

Q. Suppose, Mr. Grunsky, that the obsolescence occurred as the result of competition, and that under competition the rate payer had enjoyed very favorable rates, but that as soon as the competition ceased and the consolidation took effect the company raised the rates, there would not be a reduction, to be sure, in that event, would there?

A. That is a very complex case, because the owners of the competing plants were making unwarranted sacrifices for the public's benefit. It is one of the unfortunate circumstances that in matters of this kind competition has been allowed which was not justified. The mere existence of two companies in one city like San Francisco may be perfectly legitimate when they cover separate territories, and the like. That is not what I mean by obsolescence at 1191 all. I only stated that, when property is duplicated and has become useless, it might, to some extent, be treated in a similar way. I do not mean to say that all property that is useless or that becomes useless by reason of such combination becomes a burden on the rate payers.

Q. Suppose that we followed out your idea of obsolescence occurring which resulted in economies. As I understand it, you favored letting the owners continue the higher rate in effect for a few years until the loss of the old plant was amortized before any reduction was granted to rate payers.

A. My idea would be that with the consent of the owners there might be an immediate partial reduction, but not a complete reduction in the rate that would ultimately prevail under the new system. The only point I think I made was that there would be no hardship upon the rate payers if the current rates were maintained for some time longer and the entire reduction in cost of operation allowed to go to the owner until that abandoned property had been fully amortized. But the owner would probably find it to his interests, and would readily agree to let a part of that reduction in cost of operation go to the rate payer, in order that his business might extend. His retention of his part of the reduction would 1192 thus be carried over a longer period. You might ultimately get to a time when the whole benefit of the innovation would go to the rate payer without the owner sacrificing any part of the loss by reason of the obsolescence.

I am assuming that a part of that article which goes out of use by reason of obsolescence has already been amortized, that is, that some capital invested in it has already been returned to the owner; that there is only a portion of its original cost, still remaining in the

plant as unretired property, and that that portion would be amortized out of the future earnings. The period of years over which it would be amortized would determine itself. If you allowed the rates to remain exactly as they were, the cost of operation is reduced by a definite amount. The relation of that definite amount to the total amount to be amortized would determine the number of years. That is not the way I would do it. That is not the way I think it would be done in practice, because it certainly would be to the interest of the owner of the utility to permit the rate payer to share in some measure of that reduction of cost of operation. That would have to be determined by the old practice of seeing where the largest net return could be obtained. It would be the old question of all the traffic would bear applied in a different way. The owner would analyze the situation and determine, will I be better off if I ask that this entire additional profit remain in 1193 my hands for five years, or will it be better for me to let the amortization of the abandoned property continue over ten years? I think it would be a very advisable procedure if the regulating body should make a small reduction and let the rate payer have the immediate benefit, and let the owner retain the rest and amortize in ten years instead of five years, and I think the owner of the utility would at once consent to it, always providing that the rates are reasonable.

With regard to casualties and contingencies, I consider that there is a limitation in the amount of risk that should be compensated by funds rather than a hazard of the business. I think, however, it is very difficult to know where to draw the line. I think that the public and not the public utility should be made to suffer for losses caused by war, invasion or insurrection; that is, such losses should be accounted for by an amortization fund rather than by hazard of the business. There may be cases where the owner should share in the losses, but whether he should stand the entire loss is another question. I think that all the losses suffered by gas companies in Belgium today because of war will be made good to the individual owners. I think that the entire public will be called upon to do it.

I don't think that the loss will be made to fall upon the rate 1194 payer. I think that in cases of disaster like the earthquake and fire in San Francisco the losses should be treated just as though the owners were the agents of the public and that the public owned the utility.

Q. The public, or individual members of it, owned a great deal of property that they lost and never got back. They charged it up to casualty and contingencies, and never attempted to wipe it off; they started in anew. Is it your opinion that the stockholders of the public utility are necessarily in a different position than the ordinary citizen?

A. I think so. I think that the public utility is entitled to somewhat different treatment. The gas business may be called something of an industry.

Q. In the ordinary course of economic adjustment, would you say

that the net returns from industries of that general character, chemical industries, would necessarily be much in excess of a fair interest rate plus a small profit. I am not speaking of war conditions now, but of normal conditions, where competition affects the amount.

A. It would depend, Mr. Searls, on what the interest rate is applied to, whether you apply the interest rate to the natural rate base, as I have defined it, and then allow something for the hazards of the business, for the participation in prosperity of the community, and for management in addition, or whether you use value as the 1195 starting point, including going value, and then determine what the proper return allowance should be. It would make a difference which of those two procedures are followed.

Q. My idea was whether in the ordinary industrial business under competitive conditions in normal times the rate of return would not adjust itself to something approaching a fair interest rate plus a small profit to the owner of the business.

A. Oh, yes, it would. The public utility investor expects a little more than interest rates plus a small profit for the hazards of the business, from his investment. As I explained, he expects to be compensated for his management and for the facilities which are provided through him for giving the public the enjoyment of certain things that they otherwise would not be able to enjoy. He is also entitled to share in the general prosperity, whether he owns real estate or not. I think in that respect he differs somewhat from the owner of a private business.

Usually the public utility owner is a corporation and the management is handled by its Board of Directors and officers. A great many public utilities have only a limited number of stockholders, so that the Board of Directors can represent the stockholders. There are other corporations where the stock is widely distributed. 1196 Besides the Pacific Gas and Electric Company where a small group does not hold the controlling interest, my recollection is that there were some 1,800 stockholders in the Spring Valley Water Works when I was city engineer. I don't know how the stock is distributed. I know that it is common practice to place the stock in the hands of trustees in order to effect a control through a few persons. The usual practice is for those few persons to be compensated by salaries, which are graded according to their ability, not alone as managers, but ability to command certain compensation in the market. The men who control the business are compensated for the time they devote to the work, or they are supposed to be. That is entirely distinct from the return which they get for their capital which is invested in the corporation and that all goes as a part of the overhead or ordinary operating expense.

Q. Now, Mr. Grunsky, as I understand your testimony here as a whole, you have stated that the principles which you have elucidated, you believe should be applied to the particular plant under investigation here, but you have not testified to these principles with particular reference to this company, that is, you did not deduce the principles from a study of the books of the Pacific Gas & Electric Company, or its properties?

A. No. They are not based on the books of the company. They are for general application.

1197 Redirect examination.

Mr. Bosley:

Q. Mr. Grunsky, there is one matter about which you were examined this morning upon which I want to invite your further consideration. Mr. Searls, in his question, stated that a company having certain obsolescent property might be considering the sale of its property; another concern might be considering the purchase of that property; he wanted to know whether or not in your judgment the purchasing company would pay the full reproduction value of the property that was either obsolete or about to become obsolete, considering that it would also obtain the right to provide for the amortization of that obsolete property out of savings to be made subsequently, and you answered, I think perfectly correctly, that a purchasing company would not, under those circumstances be disposed to pay as much for the obsolete property with the theoretical right to provide for the amortization of it as it would for property that was entirely new and up to date, and without any evidence of obsolescence. Now, I want to introduce a different factor into that situation; suppose the selling company not only holds the property a part of which is obsolete or about to become obsolete, but also holds under and by virtue of patent rights the sole and exclusive right to use the invention, whether it be of apparatus or of process, which makes the old plant obsolete, so that it alone may within the period for which

1198 the Letters Patent have been granted avail itself of this new process, and may therefore continue the use of the old apparatus until it is worn out and has to be replaced in the ordinary course of business, or may at once put into use the new apparatus required for availing itself of the new invention, according to whether or not it is satisfied that the rate-regulating bodies will allow it, in case it makes use of the new invention, to amortize the value of the property that would be abandoned as obsolete; under such circumstances, state what, in your opinion, would be the basis upon which the purchase and sale would be negotiated, and whether or not the purchase and sale would be made in such a way as to give the previous owner the full benefit of this supposed right to provide for obsolescence?

A. I think in such a case there is no question that the arrangements made between the original owner and purchaser would be such that the original owner would be fully protected, because the patent right would give the original owner the power to adequately protect himself.

Q. The original owner under those circumstances would not be disposed to sell his obsolescent property at a sacrifice unless he could also sell the patent right at a profit at the same time?

A. That is true.

Q. And the purchaser would not be disposed to purchase the ob-

solete plant unless he could also secure the right to make use of the new invention?

A. Yes, and then the arrangements that are made between the two would be affected by what is expected to be the action of 1199 the rate-regulating authority. If that were known in advance, it would have some influence upon the terms on which the transfer would be made.

Q. And that, like almost all other questions pertaining to value is a matter that rests ultimately in the judgment of the parties to the transaction, is it not?

A. Yes.

Mr. Bosley: I am frank to concede that, if the purchasing party possessed the invention, either as a secret process or by virtue of patent rights, he would not pay full value for obsolete property, and the former owner would not get the full reproduction value of it.

Mr. Searls: The patent rights would not have anything to do with it; the purchaser would not buy unless he could get the patent rights and the seller would want to get something for his patent rights, naturally. I don't see what that has to do with the value of the plant.

1200 B. Accruing depreciation exclusive of capital losses attributable to obsolescence, fire or earthquake.

Mr. M. H. BRIDGES, plaintiff's general auditor, witness recalled for the plaintiff, testified in substance as follows:

I have compiled from the books and records of the Pacific Gas and Electric Company and its predecessors, the San Francisco Gas and Electric Company and the San Francisco Gas Light Company, statistics with respect to their gross revenues, their expenses of operation and maintenance, their expenditures and charges for depreciation, their capital investments and other financial matters. The books and records of the San Francisco Gas and Electric Company and the Pacific Gas and Electric Company covering their business and financial affairs for the period from the time of the great fire and earthquake in San Francisco in April, 1906, down to the present time are all in my custody and subject to my control. Nearly all of the books and records of the San Francisco Gas and Electric Company and its immediate predecessor, the San Francisco Gas Light Company, were destroyed by fire in April, 1906. Among the books and records preserved were the following, viz: Two books designated as "statistical records" purporting to have been compiled from the books of account of the San Francisco Gas Light Company and covering the period from 1873 down nearly to 1896; certain

1201 balance sheets, annual reports and a few other records of the San Francisco Gas and Electric Company which contain considerable information concerning the financial transactions of that company from 1896 down to April, 1906; and also some reports and statements compiled by the auditors of those companies or accountants employed for special purposes.

I have carefully prepared certain typewritten statements in which are set forth the facts and information which I have compiled from the aforesaid books and records, and these statements I believe to be substantially correct.

N. B.—The statements here referred to were admitted in evidence by the Master and were marked plaintiff's Exhibits Nos. 21, 41, 58, 60, 72, 80, 81 and 82.

The following table compiled from page 7 of said Exhibit No. 72 and said Exhibit No. 82 shows the net amount of charges for current realized depreciation in the San Francisco gas properties for the period from April, 1906, to December 31, 1916, exclusive of charges for or losses attributable to obsolescence, fire or earthquake, viz:

1202	Year.	Net current depreciation S. F. gas department.
	1906.....	\$345.00
	1907.....	77,981.13
	1908.....	122,765.00
	1909.....	94,152.31
	1910.....	101,062.38
	1911.....	125,270.58
	1912.....	70,113.83
	1913.....	57,433.24
	1914.....	57,085.79
	1915.....	170,124.90
	1916.....	199,581.95

The charges for current depreciation shown in the foregoing table do not include any charges for the abandonment of the Martin Station gas plant in June 1915.

The following table compiled from Exhibit No. 81 shows, for the period of five years from January 1, 1912, to December 31, 1916, the balance in the plaintiff's depreciation reserve established for its entire system at the end of each year and the annual allotments or amounts appropriated and added to plaintiff's depreciation reserve for its entire system, and also the net charges for its entire system for realized ordinary depreciation, exclusive of extraordinary losses for each of said years:

1203	Year.	Balance in reserve.	Annual allotment.	Net de- preciation charges for entire system.
1912....		\$2,789,446.52	\$2,500,000.00	\$622,195.58
1913....		2,433,492.65	1,462,462.53	518,568.40
1914....		2,471,862.23	1,000,000.00	916,630.42
1915....		2,772,848.01	1,380,000.00	762,328.47
1916....		3,002,897.61	1,250,000.00	1,019,950.40

Mr. Bridges further testified with respect to the matters shown in the last two tables as follows:

In the year 1912 the Pacific Gas and Electric Company's annual allotment to its depreciation reserve was \$2,500,000.00. Of this allotment approximately \$1,500,000.00 was taken out of income and the remainder out of surplus. In preparing Exhibits Nos. 80 and 81, I have started with the year 1912 because the Pacific Gas and Electric Company took over the properties of the San Francisco Gas and Electric Company just before the end of 1911. At the beginning of 1912 the Pacific Gas and Electric Company started out with a new depreciation reserve account. Prior to 1912 the San Francisco Gas and Electric Company maintained a separate depreciation reserve account. No separate depreciation reserve account has been kept by the Pacific Gas and Electric Company for its San Francisco gas department since the beginning of 1912. In 1913 and in 1915 some extra items of capital losses which were not a part of current depreciation charges were written off. In the San Francisco district, in the year 1913, the sum of \$528,936.00, which is 1204 shown on sheet 7 of Exhibit No. 72 and which represents a part of the loss at the San Francisco Gas and Electric Company's North Beach plant which occurred in April, 1906, was written off in addition to the current net charges for depreciation. In the same year other large amounts representing properties outside of San Francisco which actually had been abandoned prior to 1912 were written off. The aggregate amount of the extra depreciation charges for 1913 which were deducted from the depreciation reserve was \$1,299,848.00. In the year 1915 charges for other than current depreciation amounting in the aggregate to \$316,685.75 were deducted from the Pacific Gas and Electric Company's general depreciation reserve over and above the net amount of charges for current depreciation. This item of \$316,685.75 included an item of \$244,654.75 which represented the estimated value of certain gas mains in San Francisco which had been abandoned prior to 1912 but had not previously been written off in the company's books.

The Pacific Gas and Electric Company, since the beginning of the year 1912, has appropriated annually as an allotment to its depreciation reserve an amount which approximates the sums written off during the same period for depreciation, that is to say, properties abandoned or destroyed. The company has not in general made provision in its depreciation reserve for special losses or large losses attributable to obsolescence. The amount of the Pacific Gas 1205 and Electric Company's annual allotment to its depreciation reserve is determined by Mr. A. F. Hockenbeamer, its second vice-president and treasurer, and has been based in general upon the amount written off during the year for accrued depreciation. The plan followed contemplates maintaining a balance in the depreciation reserve account of approximately \$2,500,000.00 or \$3,000,000.00. The amount of the annual allotment is varied to meet the conditions of the company's business. In some instances, as I have already stated, we have written off amounts for prior losses which

had not previously been charged against the depreciation reserve. The only large amounts representing parts of plant which have been destroyed or abandoned and which have not yet been written off or charged against the plaintiff's depreciation reserve, so far as I have been able to determine, are the amounts representing the losses in the plaintiff's San Francisco gas department which resulted from obsolescence, fire and earthquake. The amount of the plaintiff's investment in its Martin Station gas plant, namely, \$429,844.75, as shown by its books, has not yet all been written off or deducted from its depreciation reserve. The Pacific Gas and Electric Company has not, up to the present time, used as a basis for making annual allotments to its depreciation reserve any estimate made for the purpose of ascertaining either accrued or accruing depreciation on any theoretical basis.

1206 C. Capital losses attributable to obsolescence, fire or earthquake.

Mr. M. H. BRIDGES, a witness recalled for plaintiff, testified in substance as follows:

According to the extant books of the San Francisco Gas Light Company, the cost of its North Beach gas manufacturing plant was \$1,162,831.21. The parts of that plant which were still in existence at June 30, 1914, were appraised by Mr. E. C. Jones in plaintiff's Exhibit No. 3 at the sum of \$273,884.71, and the difference between these two amounts is the sum of \$888,946.50 which represents accrued depreciation realized in 1906. Concerning the gas manufacturing plant of the Equitable Gas Light Company, the only direct information which I have been able to obtain is a report printed in the San Francisco municipal reports with respect to lighting rates from 1898 to 1907. This report shows that the investment in that plant was the sum of \$230,500.00.

From the information derived, as I have already stated and from information given to me by Mr. E. C. Jones, I have compiled a brief statement or summary showing the original cost or appraised value of those parts of the San Francisco Gas and Electric Company's properties which, according to Mr. Jones, were practically obsolete at the end of December, 1905, and were subsequently destroyed in the earthquake and fire in April, 1906. A true copy of this statement, which appears as sheet 16a in Plaintiff's Exhibit No. 58, is as follows:

Obsolescence at December 31, 1905, at the Time the Pacific Gas and Electric Company Purchased the San Francisco Gas and Electric Company.

Gas Department:

San Francisco Gas Light Company, North Beach Station, Original Cost	\$1,162,831.21
In Service after December 31, 1906.....	273,884.71
<hr/>	
North Beach Obsolescence	888,946.50
Potrero Station	550,000.00
Pacific Gas Improvement Company, North Beach	1,054,282.10
*Equitable Gas Light Company	230,500.00
<hr/>	
Total Obsolescence at December 31, 1905	\$2,723,728.60

Electric Department:

Edison Light and Power Company, Station 'B' Townsend Street	933,400.00
Station 'C' Jessie Street	1,100,358.00
<hr/>	
Total Obsolescence at December 31, 1905	\$2,033,758.00

Summary.

Gas Department	\$2,723,728.60
Electric Department	2,033,758.00
<hr/>	
Total	\$4,757,486.60

On April 18, 1906, the San Francisco Gas and Electric Company suffered a loss by the destruction by earthquake and fire of property which is not included in the statement designated above as sheet 16a of Exhibit No. 58. The amount of this additional loss suffered by the San Francisco Gas and Electric Company in April, 1906, in its gas department was the sum of \$988,563.00 and in its electric department the sum of \$1,052,570.00 as shown in plaintiff's 1208 Exhibit No. 17. Said Exhibit No. 17 contains a detailed statement of the property losses occasioned by fire and earthquake in April, 1906, as estimated by Mr. John A. Britton, the plaintiff's general manager. To arrive at the figure of \$988,563.00, representing the fire loss in the gas department, I have taken the losses shown in said Exhibit No. 17 under the heading Distribution Capital and Joint Property Account, the latter including office and warehouse buildings. The rest of the fire losses shown in Exhibit

* Value from Page 636 Book "San Francisco Municipal Reports."

No. 17 were included in the properties shown as obsolete in said sheet 16a of Exhibit No. 58.

The figure \$1,052,570.00, representing the fire loss in the electric department, was also taken from Exhibit No. 17 and includes the amounts shown in that exhibit under the headings Distribution Capital and Joint Property Account in the electric department. The items representing the fire loss of generating capital in said Exhibit No. 17 are all included in the electric department losses shown on sheet 16a of Exhibit No. 58.

1209 Mr. E. C. JONES, plaintiff's Chief Gas Engineer, recalled as a witness for plaintiff, testified as follows:

At the beginning of January, 1906, when the plaintiff acquired by purchase of stock the control of the San Francisco Gas and Electric Company, the latter had a gas manufacturing plant or works at the Potrero in San Francisco, which I will designate as the Potrero Station. At that time, the gas manufacturing plant at the Potrero Station consisted of 42 benches of 6 clay retorts each, used for the manufacture of coal gas, and 4 Springer water gas generators, together with auxiliary apparatus necessary for the operation of the coal and water gas plant. I knew the cost of some of the units of this plant and estimated the cost to reproduce at that time the remaining parts. This estimate was made by me in January, 1914. My estimate of the cost of the plant which I have described was the sum of \$550,000.00.

The 42 benches of clay retorts used for the manufacture of gas were installed between 1870 and 1872. There were also 18 benches of 6 clay retorts each, which had been added in 1885. Two of the Springer water gas generators were installed in 1888, and the other two in 1903. No part of the gas works at the Potrero Station which I appraised at \$550,000 was used after April, 1906. No part of these works was destroyed, nor appreciably injured by the earthquake or fire of April, 1906. The coal gas benches which had been constructed about 1872 had not been abandoned prior to January, 1210 1906, but improvements had been made in them from time to time. The making of these improvements involved the abandonment of some brickwork and fire-brick settings in the case of the original 42 benches. The improvements made in some of the 18 benches involved greater changes.

Some of the original 42 benches were removed in the early part of the year 1906 to make room for No. 1 and No. 2 Jones oil gas sets; but up to the time of their removal they were ready to make gas.

Considered as coal gas works, the benches at the Potrero Station, with the improvements that had been made in them, were up to date and suitable for the manufacture of gas. Between 1872 and 1906, or until the introduction of the oil gas generators, there was no abandonment of the coal gas benches for obsolescence.

I was quite familiar with the Pacific Gas Improvement Company's gas generating plant at North Beach in San Francisco from 1891 down to the time of its destruction in 1906. In the latter part of

1913 or the early part of 1914 I made an appraisement or estimate of the cost of that plant. In making this appraisement, I employed my notebooks and availed myself of my general knowledge of the cost of construction of apparatus of that character. I made an estimate of the approximate cost of the said gas-making plant of the Pacific Gas Improvement Company and then deducted from the total appraisement the estimated cost of a part of the plant which was not destroyed by the earthquake and fire in 1906, to-wit, a gas-holder, a meter and governor-house, a brick wall surrounding the meter and governor-house, the fencing around the holder, and two oil tanks, that subsequently were moved to the North Beach Station of the San Francisco Gas and Electric Company but were never used there. By this method, I appraised the reasonable cost of construction of that part of the Pacific Gas Improvement Company's gas-manufacturing plant which was destroyed by the earthquake and fire in April, 1906, at \$1,054,282.00. The parts of that plant which were not destroyed by the fire and earthquake in April, 1906 have not been in use since that time, and are not included in my inventory and appraisement (plaintiff's Exhibit No. 3) as a part of the plaintiff's plant used in its San Francisco gas department business.

The entire gas-manufacturing plant of the Pacific Gas Improvement Company was obsolete at the moment of the earthquake in April, 1906. In fact, it had not been used for some time prior to that time. The gas-manufacturing plant of the Pacific Gas Improvement Company consisted of up-to-date coal gas apparatus and water gas apparatus and had been kept in good repair. Its obsolescence was due to the fact that oil suitable for gas-making purposes had become plentiful and cheap and that oil gas generators, which were more economical in operation, had been brought into use. Seven of the water gas sets at the Pacific Gas Improvement Company's plant were what are known as the Lowe super-heater water gas sets; and there were some others that embodied the results of their own inventions and experiments. The entire gas generating plant of the Pacific Gas Improvement Company was destroyed by the fire and earthquake of April, 1906, except the parts which I have already mentioned; but no part of that plant would have been used thereafter if it had not been destroyed. In my opinion, the gas works of the Pacific Gas Improvement Company, both the part designed for the manufacture of coal gas and the part designed for the manufacture of water gas, were as good as many plants in the United States today. There have, however, been some advances in the art of coal-gas making since 1906.

The gas-manufacturing plant of the Equitable Gas Light Company, mentioned by Mr. Bridges in his testimony, was a water gas plant and the generators installed there were provided by the United Gas Improvement Company of Philadelphia. These generators were of the type known as the Lowe double super-heater water gas generators, and were of the same type as those that were installed at the Independent plant. I was not very familiar with the plant of the Equitable Gas Light Company, although I obtained some knowl-

edge of it from the fact that I dismantled it. The Equitable Gas Light Company's plant was not used after April, 1906. The buildings constituting part of that plant were badly shaken up by the earthquake and a part of the plant was destroyed. One of the gas-holders of the Equitable plant was moved over to the Independent plant and converted into an oil tank. I think that one or 1213 both of the gas generators at the Equitable plant were also removed to the Independent plant.

(NOTE.—From the Jones inventory and appraisalment (plaintiff's Exhibit No. 3, volume 2, page 122) it appears that the entire generating equipment at the plaintiff's Independent station or plant consisted of six water gas sets including generators, superheaters, carburetors, washboxes and scrubbers complete, and that said six water gas sets were appraised at \$12,211.29 each, the total appraised value being \$73,267.74 plus an overhead of 10%.)

The North Beach plant of the San Francisco Gas and Electric Company was in large part destroyed by the earthquake and fire in April, 1906. A part of that plant, namely, a 2,000,000-foot gas-holder, a small relief holder, a boiler plant and a small office building, is still in use and was included by me in my inventory and appraisalment. At the time of the earthquake in April 1906, all of the gas-generating apparatus in this North Beach plant of the San Francisco Gas and Electric Company was obsolete as a result of the abundant supply of oil and the development of oil-gas manufacture. The water-gas part of that plant was, however, actually in operation until the moment of the earthquake on April 18, 1906; but the coal gas benches located there had not been in use for some time. In fact, a part of those coal gas benches had never been fired up. If that plant had not been destroyed by the fire and earthquake of 1214 1906, we would have ceased to operate it as soon as we completed the construction of the required number of oil gas generators.

During the years 1900 and 1901 and until the last day of February, 1902, I was chief engineer of the San Francisco Gas and Electric Company and was in entire charge of that company's electric department as well as its gas department. At the time of the earthquake in April, 1906, the electric apparatus in the San Francisco Gas and Electric Company's Station B on Townsend Street and its electric apparatus in Station C on Jessie Street were really obsolete. Station B on Townsend Street was filled up with the old fashioned Brush-arc machines for street lighting and they were obsolete. Station C on Jessie Street was equipped with a lot of small units of the direct current type and they were both inadequate and obsolete.

In the early part of 1906 the principal electric power plant of the San Francisco Gas and Electric Company was at the Potrero at Station A (sometimes called Independent station). Said Station A at the Potrero was the San Francisco Gas and Electric Company's principal power plant after its acquisition from the Independent Electric Light and Power Company in 1903. During that period

the San Francisco Gas and Electric Company obtained a part of its electric power supply from the Standard Electric Company of California. The electric power plants which I have designated as Station B and Station C were entirely destroyed in April, 1906, 1215 by fire and earthquake. There was a fire at Station C on Jessie Street in February, 1906, which did considerable damage.

(NOTE.—Further testimony of Mr. E. C. Jones with reference to the obsolescence of the Martin Station gas-manufacturing plant and the Independent gas-manufacturing plant is contained on pages 187 to 196 of this statement, under the heading "Depreciation Attributable to Deterioration, Inadequacy and Obsolescence.")

1216 Cross-examination of Mr. E. C. Jones:

A copy of an affidavit which had been made by Mr. E. C. Jones, January 17, 1914, at the hearing of plaintiff's motion for preliminary injunction in case No. 27, one of the above entitled cases, was at this point admitted in evidence and marked "Defendants' Exhibit No. 78." The substance of this exhibit appears in the following testimony of Mr. Jones given on his cross-examination.

I remember making the affidavit of which Exhibit No. 78 is a copy.

I came to San Francisco in May, 1891, for the purpose of constructing a new gas manufacturing plant at North Beach for the San Francisco Gas Light Company. At that time I found the gas works at First and Howard Streets operating to its full capacity as a coal gas plant.

I furnished Mr. Bridges with the information as to all of the property which had obsolesced at December 31, 1905, as shown by the figures on sheet 16-A of Plaintiff's Exhibit No. 58. The figures relating to the First and Howard Street-plant, which are contained in this affidavit (Defendant's Exhibit No. 78) do not appear in Plaintiff's Exhibit No. 58. That plant had obsolesced many years prior to December 31, 1905. The statement on page 1 of this affidavit that the first gas works or plant erected in San Francisco was located at First and Howard Streets, that it began to supply gas to San Francisco in February, 1854, and that that plant included benches 1217 of three iron retorts each with wet lime purifiers and other apparatus which became obsolete and were abandoned about 1863, is correct. The exact date that the works began to supply gas to the City was February 11, 1854. The retorts, purifiers and other apparatus which became obsolete represented an actual investment of approximately \$150,000.00. I had charge of that plant and the dismantling of it after I came to San Francisco. It was never operated as anything but a coal gas plant. In this plant there were erected 20 benches of five clay retorts each in 1863 and 16 additional benches of six clay retorts each in 1868. This was an improvement in the art which necessitated the obsolescence and abandonment of some of the old plant. This improvement was in the furnace construction for heating the retorts and in increasing the size of the retorts themselves. New and improved purifiers and condensers of a

different type were installed for use in connection with said benches of clay retorts. For instance, the old method of purification was changed from wet lime to dry lime. Dry lime purifiers were installed at First and Howard Streets plant, and there was an improvement in the condensers and scrubbers. The ground room was so limited at First and Howard Streets that it became necessary to replace old apparatus with new, so that the new plant really occupied the ground formerly occupied by the old. It was an exchange of apparatus. The amount of the investment represented by this amount of apparatus which became obsolete in 1891 and which up to that time had been maintained at full operating efficiency, was the sum of approximately \$300,000.00. That was a very conservative estimate. It was based on my knowledge of the cost of those early types of benches, condensers and scrubbers and the small holders that were in use at First and Howard Streets. I kept the value well down, so that when I say \$300,000.00 or a total of \$450,000.00, it is a most conservative figure. I know for a fact that the apparatus represented much more money than that. That estimate was not based on note book figures. It was based on the fact that I had lived with that gas works and I tore it down. At that time I was employed in the manufacture of coal gas and knew off-hand the value of benches, retorts and other apparatus, so it was a very simple matter for me to estimate the value. This estimate covered gas works equipment and holders, but not the buildings or land. The buildings were abandoned, but I did not estimate their value in making this affidavit. I remember that very distinctly.

In this affidavit I state that the gas works on King Street, which was formerly owned by the Citizens Gas Company, was completed and began to supply gas in January, 1866, and was in use from 1219 that time to some time previous to 1891, when it was dismantled and sold as junk because it had become obsolete; that at the time it was dismantled it consisted of 20 benches of 5 clay retorts each with the necessary condensers, scrubbers and purifiers and represented an investment of approximately \$300,000.00. I did not include that item in the list on page 16 A of Exhibit 58 because the obsolescence had taken place long prior to 1905. I do not know whether this plant had clay retorts or iron retorts when it was first completed in 1866. All that I know about it is that when I came to California in 1891 I was shown the plant and it was in a fair condition at that time—gas could have been made at that plant. I was told that it never would be started up again and that I should not consider it until I found time to dismantle it and sell it as junk. The plant was located on water-front property, which is very close to the present deep water berths of the old Pacific Mail and Japanese Steamship Companies, and it was considered a bad location for a gas works. That was one reason for dismantling it. This estimate of \$300,000 does not include the very substantial brick buildings. The main building at King Street was a substantial rather ornamental well-built brick building, which included the retort house, the 1220 purifying house, condensers and scrubbers, moving machinery, station meter and a small office. This estimate cov-

ers the value of the apparatus and the coal runs, which were very extensive, and a gas holder located at Townsend and King Streets. The type of condenser and scrubber did not change materially between 1860 and 1870, so that the King Street scrubbers and condensers were the same that were installed when the works were built. The King Street works were much more modern than the original Howard Street works. That is evidenced by the fact that nothing is said about iron retorts at King Street. They started out with clay retorts, whereas the old works at First and Howard Streets started in at almost the beginning of the gas business and grew up with it. There had been great improvements in the machinery for manufacturing coal gas between the years 1866 and 1891. There had been furnace improvements installed in King Street. You understand that the clay retorts in 1866 lasted only about a season—sometimes they could be stretched over for two seasons covering 24 months. Every time these benches, containing groups of anywhere from 3 to 9 or 12 retorts, were repaired it was not necessary to tear down the whole structure. The benches of retorts are built
1221 in long sections, a bench consists of an arched opening furnace with side walls. The furnace is built underneath this arch, the retorts are superimposed over the furnace fire. As minor improvements in the furnace construction for heating retorts develop, they can be applied from year to year as the furnaces are rebuilt and the retorts are renewed. I could see at King Street when I first visited the works that they had kept up with the art as far as they knew it up to that date when the works were shut down. Of course in 1891 the King Street works was an old fashioned works. They had undoubtedly replaced portions of that plant from time to time with more modern apparatus.

Mr. Searls: You said with respect to the Potrero Plant in your direct examination that the coal gas plant was in a sort of a metamorphic condition, about that time (1891) improvements were being developed in the manufacture of coal gas by the application of regenerative furnaces to the coal gas benches. You state that you were asked to try a series of experiments with different types of coal gas furnaces to demonstrate which was the best.

In your affidavit, on page 2, you give a little history of the Potrero Works, in which you state that the plant was built in 1870
1222 and began to supply gas in 1872; that it consisted of 42 benches of 6 clay retorts each, two gas holders with a given capacity and the necessary condensers, scrubbers and purifiers. In 1885, 18 benches of 6 clay retorts each were added. During the summer of 1888 two Springer water gas generators, 12 feet in diameter, were installed. Then you go on to describe the increase in capacity of these works in 1903 and state that this apparatus represented an investment of approximately \$550,000.00 that corresponds with the figure which you gave Mr. Bridges for the Potrero Station and which he has included on page 16 A of Exhibit 58. So you did include that as a part of the gas works which had become obsolete at December 31, 1905.

Mr. Jones: Yes. The 42 benches of sixes, originally built between

1870 and 1872 were not used after 1892 or 1893. They occupied the room now occupied by what are known as the four old Jones sets, the oil gas sets. In 1891, the coal gas works at the Petrero had not been abandoned; the 42 benches were nearly all in readiness to make gas, some were under repairs; the 18 benches of retorts in what we call the new house were under fire and making coal gas, and the two Springer water gas sets were manufacturing gas. The 42 benches were abandoned when we began to make water gas at the North Beach tation in the Fall of 1891. This estimate of \$550,000.00 which I have included in my affidavit included the cost of the 42 benches of sixes and the 18 benches of sixes in the new house and the Springer apparatus. That is a very conservative figure, because I believe there were some patent rights connected with the Springer apparatus which expired with them. The furnace construction was what is known as half-depth regenerative, which was modern at that time. It was the latest improvement in coal gas as of 1872. Under the splendid management of Mr. J. B. Crockett, the president and engineer of the San Francisco Gas Light Company the latest improvements in the manufacture of coal gas had been installed, both in furnace construction and in the installation of the larger retorts, so that when I came here in 1891 they fairly represented the ordinary coal gas apparatus. In the new house the 18 benches were what are known as full depth regenerative benches. About that time there were improvements inaugurated in coal gas manufacture.

1224 Some German inventions had been made and Mr. Crockett appointed me to make the experiments between these German benches and the benches made by the Manhattan Fire Brick Company of New York. So we tore out four benches of the 18 and installed these latest improvements in coal gas manufacture. On the showing made by the better of these types of benches we adopted the type which was subsequently installed at North Beach Station where we put in 20 benches of 9 retorts each, built by the Manhattan Fire Brick Company of New York. There undoubtedly had been a substitution of a good deal of new and more improved apparatus between 1870 and 1892. It was Mr. Crockett's practice to make a trip east about every year for the purpose of observation. He visited Eastern gas works and adopted all the new ideas in gas making and came back and installed them, so that San Francisco had a thoroughly up-to-date gas works from the very beginning.

Mr. Searls: I want to get, if possible, how much of this investment of \$550,000 was represented by apparatus which was installed about the year 1891 and replaced apparatus which was probably gone when you got there, Mr. Jones?

Mr. Jones: It would be very difficult to give an intelligent answer to that question for the reason that you use the year 1891.

At that time the 18 benches of sixes in the new house were
 1225 considered good for making coal gas. The change in four of them made them nearly as good as the best that they use today in the East of that type of horizontal retorts, so that the 18 benches of sixes and the Springer water gas sets could be held on

the books available and useful gas machinery up to the time of the introduction of the first oil gas in San Francisco.

This figure of \$550,000 does not include the buildings. The buildings are still in use for housing the old Jones sets. The new building is used for housing the improved apparatus.

When I came here in 1891 the plant at Third and King Street was owned by the Pacific Gas Improvement Company. That plant was built in 1880 and consisted of 2 benches of 4 iron retorts each with the necessary condensers, scrubbers and purifying apparatus. This plant was dismantled in 1881 with the exception of the gas holder, because it had become obsolete. The amount of the investment as shown by this affidavit was the sum of approximately \$60,000, exclusive of the sum invested in the gas holder. The gas holder was in use at that location up to the fire in 1906 when it was abandoned because it was so badly damaged. That was not included in

the list of obsolesced property that I gave Mr. Bridges. 1226 I do not remember that there was any generating apparatus at that plant in 1891. It was just an abandoned works. This note about the Central Gas Company is historical. It is taken from the records of the company. There was no means of my knowing of my own knowledge that that plant was built in 1880, because I did not come on the ground until 1891. When I came here in 1891 I found the whole thing had been moved bodily over to Webster and Francisco Streets and had become the Pacific Gas Improvement Company. Everything had disappeared except the holder.

Mr. Searls: You gave Mr. Bridges a figure for the Pacific Gas Improvement Company works at North Beach of \$1,054,282.10—that is on page 16A of Exhibit 58—and it corresponds exactly with the estimate which you made of the North Beach equipment of the Pacific Gas Improvement Company as stated on page 2 of your affidavit. You stated there that the plant was built in 1882 and consisted of 12 benches of six clay retorts each and a water gas plant consisting of seven Lowe generators and three gas holders with other necessary apparatus; that this plant was entirely destroyed by the earthquake of 1906, but at that time the coal and water gas equipment, including the entire plant, had become obsolete?

1227 Mr. Jones: Yes. That plant was shut down about the time of the consolidation of the Pacific Gas Improvement Company and the San Francisco Gas and Electric Company. At that time I was employed as chief engineer of the California Gas and Electric Corporation so that it did not come under my immediate charge until January 1, 1906. The statement that I made on direct examination, that the last coal gas was made at the Pacific Gas Improvement Company's works September 6, 1901, and that the water gas works were shut down and all gas making operations ceased on November 8, 1903, so that it was a dead works at the moment of the earthquake, was based on information that I obtained from the old superintendent of the works. This estimate of \$1,054,282 which I gave to Mr. Bridges included all of the plant except the holder and the meterhouse. The only salvage obtained was small junk salvage. That was a case where the salvage of the junk was not sufficient to

fill up the holes in the property and put it back into salable condition. Much of that property was below grade. There were two gas holders with tanks under ground. The junk hardly paid for the grading of the property. That estimate includes the buildings of the

Pacific Gas Improvement Company plant. The reason why 1228 the gas holder and the meter house were left out of the estimate was because it was thought that prior to the time that I made my appraisal there might be some possible future use for the holder and the meter house—which was also a valve house in connection with the holder; but it afterwards transpired that this holder, being on the grounds within the gates of the Panama Pacific International Exposition, was in a bad location and threw too light a pressure and in order to use it it would entail the expenditure of money for labor in boosting the gas in and out of the holder and it was therefore finally abandoned and dismantled. That was not included in my appraisal of June 30, 1914, except in red figures. The generators were taken out and used in various small plants scattered around. Any available shells were used in other places.

Mr. Searls: I note in Mr. Bourne's report in 1903 that those generators at the Pacific Gas Improvement Company's station and Equitable station were to be torn down and moved to the Potrero station. Do you know whether or not that was done?

Mr. Jones: Some of the generators and one of the gas holders at the Equitable were moved to the Independent station. One of the old Equitable gas holders is now used as an oil tank at the 1229 Independent station. I do not know whether the generators at the Pacific Gas Improvement plant were taken over to the Independent or not. That was during the period when I was away from San Francisco. The value of the Pacific Gas Improvement Company's generators were included in my figures of \$1,054,000. I included them all, because I figured that the small amount of salvage at the low price of junk would not any more than grade the property. If any Pacific Gas Improvement Company's generators were moved they were put into the Independent plant. That is not obsolesced. It is still an alive plant. The generators at the Potrero are known as the Springer set. There were two of them when I left the company in 1902 and there were four when I returned in 1906. If any generators were removed from the Pacific Gas Improvement Company's plant to the Independent plant, then they were appraised with the present Independent equipment in my inventory and appraisal. When I made the appraisal in 1914, I was not considering the Equitable or Pacific Gas Improvement Company plants, and it is quite possible that two of the generators formerly at the Equitable plant and included in my affidavit as obsolete are now at the Independent plant and included in my appraisal as of June 30, 1914.

1230 Mr. Bridges, in response to a question by Mr. Searls said: The figure \$888,946.50 shown on Sheet 16A of Plaintiff's Exhibit No. 58, as representing obsolescence at the North Beach plant is the difference between the original cost of the North Beach

plant at Bay and Buchanan Streets as evidenced by the books of the San Francisco Gas Light Company, and Mr. Jones's estimate of the cost or value of that part of that plant that was in service at December 31, 1905.

Mr. Searls: Now with respect to the North Beach Station, Mr. Jones, in your affidavit on page 3 you describe this plant as consisting of two Springer water gas sets erected in 1891, and the first gas was made in 1892. In 1894 a complete coal gas works was erected consisting of twenty benches of nine retorts each. In 1903 two Lowe water gas generators were added to the plant. In 1906 this plant was entirely destroyed by earthquake; but at that time it had become obsolete with the exception of the gas holder and set of purifiers, scrubbers and some portions of the plant used in connection with this works as a distributing station. The amount of the investment represented by that portion of the plant which had become obsolete was approximately \$660,000.

That is a difference of over \$200,000 from the figure which Mr. Bridges uses on page 16 of Exhibit 58. I understand that 1231 that must be because he has not taken your figures for that.

Mr. Jones: I built that works in 1891, as it appears in this affidavit, with the exception of the two Lowe gas generators that were added to the plant in 1903, which was during the time I was away. My notes in regard to the North Beach Station were quite elaborate, with photographs attached, and they were destroyed in my office in the Shreve Building following the earthquake. My daily work at North Beach so fixed the cost of that plant in my mind—excepting the land cost—that I remember the cost of various items at that plant and I remember the total cost. I know that Mr. Bridges asked me one day how much the total cost was and I told him from memory and I believe it was within \$12,000 of the book cost of the plant, and I never had seen the books. Taking the original cost of the plant as I remembered it and the cost of these various portions of the plant I arrived at the figure of \$660,000, after making allowance for salvage and parts removed to other plants.

Mr. Bridges: The figure \$1,162,000, representing the book cost of North Beach Station, included the complete installation exclusive of land. The books of the San Francisco Gas Light Company showed year to year charges right along and some segregation. I arrived at the obsolescence by getting from Mr. Jones the amount in use. I will ascertain how this difference arises and explain to the court a little later.

Mr. Jones: According to my recollection, the cost of those works, including buildings and everything except land, was \$1,150,000.

Mr. Searls: There is an item which you have not mentioned in your report to Mr. Bridges as he gives it on page 16A of Exhibit 1232 No. 58, and which you have included in your affidavit, the gas holders at Howard and Fifth which were destroyed by earthquake in 1906, but which had they not been destroyed would have become obsolete because of the undesirable location of the holders for distributing purposes. The investment represented in those holders was originally \$180,000; an accrued depreciation

in 1906 amounted to 30 per cent of their original cost; the balance, chargeable to obsolescence and contingent losses, was the sum of \$126,000. Why didn't you give that to Mr. Bridges in the statement of obsolescence as of December 31, 1905?

Mr. Jones: They were in a very undesirable location for gas holders. They were out of balance and were the bane of my existence for years. I had to keep them from turning turtle several times. I considered that the holders had about a 70 per cent value when I came here in 1891. I nursed them like a sick baby from that time up to the time of the earthquake when I was relieved of my charge.

Mr. Searls: You still stay with your statement that the holders were practically obsolete at the date of their destruction.

Mr. Bosley: Mr. Searls, that is hardly in accordance with the affidavit. It says the balance, chargeable to obsolescence and contingent losses was the sum of \$126,000.

Mr. Searls: But he says had they not been destroyed they 1233 would have become obsolete because of the undesirable location of these holders for distributing purposes.

Mr. Jones: That is our misfortune, Mr. Searls; that is one of the unfortunate hazards of the gas business.

Mr. Searls: Did you consider that those holders were obsolete at December 31, 1905, or practically so?

Mr. Jones: I considered them in this light, that the property on Howard and Fifth Street was badly suited to gas holder location and could be better used for other purposes. I think any business man would look about and try to get his gas holders in larger units on cheaper land. They were 500,000 foot gas holders. That was a million feet in two units, and required with the 8 hour working day coming into fashion three shifts of men to look after them, and pumps to get gas into and out of them; it was not a good policy to keep the holders in operation; for that reason I used this word "obsolete" because I believe a piece of apparatus may become obsolete when it is still useful. The use of it may be continued under pressure but it is still obsolete.

The value was about 70 per cent. as stated in my affidavit. That was due to deterioration. It was mostly caused by accident rather than by age because the holders of the same capacity at the Potrero Station built during the period between 1870 and 1872 are still good holders and will be used many many years to come. The 1234 holders at Fifth and Howard Streets were in about the same condition in 1891 as they were on the 18th day of April 1906. We kept them painted, scraped and repaired but they were out of balance. They were what was known as a counterweight holder.

The plant of the San Francisco Coke and Gas Company at Beach and Mason Streets was on the present location of the Metropolitan Station. I state in my affidavit that the amount of this investment was \$50,000. That property was acquired in 1911. That plant was made up of a series of experiments. The original coke ovens were built to manufacture hard coke out of bituminous coal, and afterwards oil was used in the coke ovens for the manufacture of

oil gas. Finally it became a competing company and the oil gas was sold to consumers in San Francisco; other coke ovens were built and were failures, and when we acquired the property in 1911 I found the plant to consist of two 15-foot oil gas generators which were new and are now remodeled into the improved Jones process; they became a part of that new process. The first coke oven, with its additions, due to development, and the second coke oven, which was built and invented by J. C. N. Stut, the mechanical engineer in town, now deceased, and all of this apparatus was in use, and we immediately began the tearing down of the coke ovens after we had acquired the plant and retained the two 15-foot oil gas generators.

At the time of the earthquake there was some destruction of obsolescent property but the earthquake did not do very much damage there. The fire passed over that property. At the time of the fire the plans for the gas holder which now serves us as the only storage holder we have in connection with the Metropolitan, was in course of erection—the guide frames and tanks were up—the fire passed over it but did not do very much damage, and the contractors completed that holder after the fire. Any buildings that were there were simply wooden shacks with corrugated iron coverings, and this \$50,000 represents a very conservative estimate of the coke oven construction.

Taking the results of these various changes in the gas business during the earlier years there were several steps, you might call them, of obsolescence of the various plants—one of these being where clay retorts were substituted for iron retorts. Another one being where improved purifiers, scrubbers and equipment were substituted for the old style equipment. That is true of any business as it is developing as new methods are being evolved. That was not more true of the gas business during the period preceding 1891 than it was subsequent to that time. There have been greater improvements in gas manufacture in the last ten years than there were in the previous thirty years. The greatest and highest type of improvement in methods of manufacturing coal gas was made at the North Beach Station in 1894. In the older plants in 1236 which the modern methods were introduced there was a considerable replacement of the original equipment. We made no such revolutionary changes as are now being contemplated by the People's Gaslight Company of Chicago, who contemplate doing away with modern coal gas apparatus and modern water gas apparatus and constructing an entirely new works consisting of coke ovens, whereby they make gas as a by-product, producing metallurgical coke as the main product.

In the earlier days of the gas business retorts made of cast iron were used as the only available material. These were expensive and short-lived. The purification of gas was effected by means of milk of lime and copperas in solution. The iron retorts gave way to clay retorts as soon as it became possible to make retorts of that substance, and wet purification changed to dry lime purification on account of the old method becoming a nuisance. After the introduction of clay retorts the evolution of the full depth regenerative bench began. This caused all former settings of retorts, known as

open settings and half depth generative benches to become obsolete. All this occurred prior to 1891. To give you an idea of the vagaries of the gas business, in 1891, when I left Boston, they were using wet lime purifiers at the old North End Gas Works in Boston, which were the first works developed in Boston, in 1826. They were using it successfully and as I stated in the affidavit the waste substance from wet lime purifiers is a nuisance. They would not permit it

in any community nowadays. But they were still using it 1237 as a matter of economy in Boston in 1891. It had been abandoned years before in California. In the early days back in 1891 I think the entire output of oil in California, annual output, was about 360,000 barrels a year and if that output had continued it would have been necessary for us to have obtained coal either from Australia or from Vancouver, British Columbia, or from the State of Washington, and continue to manufacture coal gas despite the fact that the freights would have been more than doubled, on account of the cessation of wheat production; but we were helped by the discovery of new oil fields, development of the California oil fields and an increase in the production of oil in California, so that we were really forced into the manufacture of oil gas. Of course, the stopping of wheat production and export from California was one factor in it, but the development of oil in large quantities and at lower prices was the main factor in changing from coal gas to another method. The coal gas gradually petered out and the water gas came in, and that was in turn gradually replaced by the oil gas process.

And each of those changes in turn caused the abandonment of only what might have been known as the generating portion of the former process of manufacturing gas. The generating portions of coal gas works are the benches or retorts and the generating portions of water gas are the generators and superheaters. By 1905 1238 the change from coal to water gas had been completed and the manufacture of coal gas entirely discontinued. That was brought about by an unusual condition. At the moment of the earthquake there was no gas being made at the Potrero station. North Beach was under fire, manufacturing water gas. There was no coal gas being made at North Beach; but the reason the Potrero plant was shut down and not manufacturing water gas was because the pipe line had been completed between Martin Station and the Potrero, and we were pumping gas into the Potrero holders from Martin Station, oil gas, so that really the introduction of oil gas was begun at this period that you speak of, soon after the acquiring of the San Francisco Gas & Electric Company and its subsidiaries by the Pacific Gas and Electric Company.

There were minor changes in the manufacture of water gas in San Francisco after it was first introduced. San Francisco adopted what was known as a Springer water gas apparatus which was merely a modification of Professor Lowe's apparatus based on his discoveries and inventions. No considerable portion of the water gas apparatus had obsolesced during the period in which water gas was manufactured, due to improvement in the art, because the improvements in the art only necessitated minor changes which could be made when

the machines were rechecked every year, that is, the Springer sets that were built as Springer sets at the Potrero and at North 1239 Beach remained Springer sets and made gas in that way until they were torn down. When the Independent works were built, and in fact at a period in the operation of the Equitable Gaslight Company, the Lowe process was introduced, and that remains the same today so there were only minor changes that would not cut so much figure. The last coal gas was made by the Pacific Gas Improvement Company September 6, 1901, and the water gas works was shut down and all gas making operations ceased November 8, 1903.

Coal gas was manufactured first at North Beach works December 27, 1895, using 10 benches, and those 10 benches were the only ones in the whole plant that ever were fired up; we had 20 benches and 10 of them were new benches, never had been used, when they were torn down. The North Beach Coal Gas Works was constructed more as a protection against a shortage of oil supply, because that works was built at a time when there was excellent reason for believing that there would be an increased production of oil, and the prices of oil would be less, which would enable us to manufacture more water gas, and it was our desire to manufacture water gas exclusively, if possible, but our people felt they should have the coal gas plant at the North Beach to protect them against a shortage or high price of oil; that was really the only reason it was built; it was never used very much.

Coal gas was made at the Potrero Station on and off from 1891 to 1903 or 4. It was a policy of the company to manufacture 1240 as little coal gas and as much water gas as possible during the years subsequent to 1895 for the reason that there is a limited and uncertain market for coke in San Francisco. All that I know about the old Metropolitan Plant at Ninth and Bryant Streets is what Mr. Crocker told me—that they bought it one morning and that it blew up the same day. It used to be a standing joke with the directors of the old San Francisco Gas Light Company. It was an experiment in oil gas manufacture using externally heated retorts for gasifying oil, or making vapor of it.

Redirect examination:

The eighteen coal gas benches of sixes in the new house at the Potrero were ready for immediate use in the beginning of 1906 and were kept in a good state of repair. The forty-two benches of sixes in the old house had been partly dismantled to permit of the building of what is now known as No. 1 oil gas set in the east end of that building. That oil gas set was the one that was constructed after January 1, 1906. It became necessary to tear down some of the coal gas benches to make room for it. The last coal gas was made by the Pacific Gas Improvement Company September 6, 1901 and the water gas works was shut down and all gas making operations ceased November 8, 1903. That was shortly after the purchase of the plant by the San Francisco Gas and Electric Company. As 1241 nearly as I can remember the plant was standing in 1906

as it was when it was shut down except that repairs and upkeep had been neglected. It was in much the same condition that Martin Station was after July, 1915, that is, it was never anticipated starting the plant again to make gas, maintenance had ceased so that it was a gradually wearing out plant. With reference to the manufacturing part of the plant of the Pacific Gas Improvement Company at North Beach the salvage after the works were wrecked by the fire and earthquake of 1906 probably did not cover the cost of restoring the ground, because the ground was very much below grade and consisted of a lot of holder pits and sink holes and it took about the scrap value of the material to grade the property but there has been some salvage from the gas holders that was included in the appraisalment of June 30, 1914 in red ink. Some of the generating part of the plant was moved around to different places. With reference to the North Beach Plant of the San Francisco Gas and Electric Company certain apparatus was moved to other places. Aside from those articles of apparatus there was practically no salvage from that plant. The photographs of the wreck, which I made shortly after the earthquake, would explain it better than I can. The works were left in such a condition that it practically cost money to remove the debris, and when I say debris I mean cast iron and twisted steel sheets, and brick and concrete, so that there was very little salvage from that plant outside of the pieces of apparatus which were
1242 recovered, getting four purifiers out of eight, and some exhausters and scrubbers which really did not amount to anything. The salvage of the coal gas works amounted to a little cast iron, which was sold to a junk man, and some steel that was sold to a junk man. As I remember it, the salvage from the retort house did not pay for leveling the ground; that is, we had to give away the building. There was no salvage except junk from the coal gas benches and other apparatus at the Potrero Station which are listed in Exhibit 58 on Sheet 16-A as obsolete property valued at \$550,000. The amount realized was not substantial because the castings consisted of mouth-pieces and standpipes and bridges and hydraulic mains which at that time could not be used in coal gas manufacture in the state, because they were not making coal gas except in one little town, the town of Jackson in Amador County, and the freight would make it prohibitive to send it anywhere else; so it was all broken up and sold for junk at a very low price, and the brickwork was torn down and used for concrete making and for brick foundations. I have always figured, in days outside of these present times when steel is steel and bricks are bricks, that there was little to be realized in the way of salvage from brick buildings or concrete structures, even though there was some steel and cast iron in the construction.

1243 Mr. M. H. BRIDGES, recalled as a witness for the plaintiff, testified in substance as follows:

An appraisalment of the property lost and destroyed in the fire and earthquake of April, 1906, was prepared by Mr. J. A. Britton, the

plaintiff's general manager. From a copy of that appraisal, constituting a part of the records of my office, I have prepared a statement which shows the amount of the losses sustained by the San Francisco Gas and Electric Company in the fire and earthquake of April, 1906, as estimated by Mr. Britton. This statement shows separately the losses in the electric department and the losses in the gas department. The statement which I now present is a correct copy of the original appraisal and the data contained therein as furnished to me by Mr. Britton and it shows in addition to the total fire and earthquake losses the expenditures made for rehabilitation in 1906 and 1907. A great part of the property which was destroyed by fire and earthquake was property which Mr. E. C. Jones has testified was obsolete and either actually abandoned or about to be abandoned for that reason. The amounts given in this estimate represent Mr. Britton's appraisal of the original cost or reproduction value of the units of property destroyed.

This statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 17.

The following is a true copy of that part of said Exhibit No. 17 which relates to the fire and earthquake losses in the gas department of the San Francisco Gas and Electric Company in April, 1906, viz:

Item.	Fire loss.
Gas Department.	
Generating Capital:	
Generating Plant and Holders.....	\$1,050,000.00
Total Generating Capital.....	1,050,000.00
Distribution Capital:	
Mains	250,000.00
Meters and Service Connection.....	499,945.00
Lamps and Posts.....	15,868.00
Total Distribution Capital.....	765,813.00
Joint Property Account:	
Office Building Sutter St.....	27,500.00
“ “ and Contents Post St....	55,000.00
Branch Office Building.....	2,750.00
Warehouse and Contents.....	137,500.00
Total Joint Property Account.....	222,750.00
Total Gas Department.....	\$2,038,563.00

The following is a true copy of that part of said Exhibit No. 17 which relates to the fire and earthquake losses in the electric department of the San Francisco Gas and Electric Company in April, 1906, viz:

Item.	Fire loss.
Electric Department.	
Generating Capital:	
Power Plant Buildings.....	\$91,992.00
Station "B" and Contents.....	400,000.00
Station "C" and Contents.....	690,050.00
Total Generating Capital.....	1,182,042.00
Distribution Capital:	
Substation Buildings and Contents.....	293,379.00
Conduits	150,000.00
Meters	164,560.00
Pole Lines (Wire and Insulators).....	262,381.00
Lamp Posts .....	.....
Transformers .....	.....
Services .....	.....
Storage Batteries .....	.....
Total Distribution Capital.....	870,320.00
Joint Property Account:	
Office Building Sutter St.....	22,500.00
" " & Contents Post St.....	45,000.00
Branch Office Building.....	2,250.00
Warehouse and Contents.....	112,500.00
Total Joint Property Account.....	182,250.00
Total Electric Department.....	\$2,234,612.00

Said Exhibit No. 17 shows expenditures for rehabilitation as follows:

	1906.	1907.
Gas Department:		
Generating Capital	\$9,840.17	.....
Distribution Capital	288,214.51	\$363,667.10
Joint Property Account.....	10,200.54	3,017.33
	\$308,255.22	\$366,684.43
Electric Department:		
Generating Capital	\$141,709.00	.....
Distribution Capital	634,028.41	\$100,000.00
Joint Property Account	4,366.08	.....
	\$780,103.49	\$100,000.00

1246 Mr. JOHN A. BRITTON, recalled as a witness for the plaintiff, testified in substance as follows:

I was elected president of the San Francisco Gas and Electric Company in January, 1906, at the first meeting of the board of directors of that company following the Pacific Gas and Electric Company's purchase of this property. I have retained that position ever since. I was very familiar with the properties of the San Francisco Gas and Electric Company prior to April, 1906. Immediately upon assuming charge of the San Francisco Gas and Electric Company's properties in January, 1906, I familiarized myself with those properties by visiting all of its plants, both gas and electric, and all of its substations, and by making a study of its maps of underground gas mains and electric conduits, and traversed the entire city to familiarize myself with its overhead lines.

Sometime after the fire and earthquake of April, 1906, I made an estimate of the property destroyed by that fire and earthquake and also of the value of that property. In preparing this estimate, I availed myself of my knowledge of the properties as they existed prior to the fire and earthquake, and relied upon my general experience. I have a memorandum of my original appraisement of those properties. This memorandum was made sometime after July, 1906, and prior to January, 1907. This memorandum was a
1247 résumé of a vast number of notes made in detail which I have not preserved.

After making my own estimate, I called in every one of the heads of departments having actual control of the properties and asked them to make an estimate for me of the destroyed properties which had been under their charge. I had them make their estimates before communicating to them the estimate that I had made. I had them give me an independent appraisal of the properties destroyed. As a result of the information given to me by the heads of departments, I revised my original estimate, making a few additions and some deductions—not many, however. I do not know positively where the figures representing fire losses contained in plaintiff's Exhibit No. 17 were obtained; I presume, however, that it was made from the figures contained in my estimate. A statement upon this subject was filed with the Board of Supervisors of San Francisco in 1908. I do not remember whether or not the amounts shown as fire losses in said Exhibit No. 17 are the same as those which were contained in the statement filed with the Board of Supervisors.

My original estimate of the fire and earthquake loss of April, 1906, in both gas and electric departments, was the sum of \$4,475,000.00. I have no memorandum showing any adjustments or corrections made as the result of my obtaining estimates from the company's engineers, with one exception. In my estimate, I gave the
1248 sum of \$450,000.00 in round numbers as representing the overhead construction material and meters in the electric department which were destroyed. The estimate made by Mr. Holberton for me gave this item as \$431,392.00. My original estimate of the gas department losses at that time was \$1,708,338.00,

and of the electric department losses was \$2,766,667.00, but this estimate was changed to some extent later as the result of conference with the company's engineers.

A few days later, Mr. Britton, having been recalled, testified further as follows:

Since my last appearance in court I have found some additional data contained in a memorandum in my own handwriting which I prepared. This memorandum corresponds with the statement that was filed with the Board of Supervisors except as to the amount allowed for joint property. The amount of that item in this memorandum is about \$200,000.00 greater than the corresponding item in the statement that was filed with the Board of Supervisors. This memorandum shows the total loss of gas department properties as amounting to the sum of \$1,815,813.00, not including joint property. This amount corresponds exactly with the amount shown in plaintiff's Exhibit No. 17. This memorandum shows the total loss in the electric department to be \$2,052,362.00, exclusive of joint property, which corresponds with the amount shown in plaintiff's Exhibit No. 17. This memorandum shows the joint property loss to be \$300,000.00 greater than the corresponding amount in Exhibit

No. 17. The items of joint property were divided between 1249 the gas and electric departments on the basis of revenue, 45% being assigned to the electric department and 55% to the gas department. The total amount of joint property loss in both departments as shown in plaintiff's Exhibit No. 17 is the sum of \$405,000.00, while in my memorandum it is shown as \$705,000.00. The amended statement which was filed with the Board of Supervisors was made subsequent to my original memorandum and after consultation with the engineers of the gas and electric departments.

1250 Cross-examination.

Mr. Searls:

Q. Mr. Britton, referring to the memorandum of the fire losses, I have a copy of the statement which was introduced before the board of supervisors in 1907, and it appears in the Municipal Reports for that year. I think it may be convenient if I hand this to your honor while I am questioning Mr. Britton. I will ask to have it inserted in the record at this point.

(The statement is as follows:)

TABLE NO. 5.

San Francisco Gas and Electric Company.

Property Destroyed by Fire April 18th and 19th, 1906.

	Gas.	Electric.
36,633 gas meters and connections	\$499,945	
955 posts and 1,053 lanterns	15,868	
Mains and Services	250,000	
Holders, Fifth and Howard Streets	300,000	
Works and holders, North Beach	750,000	
Overhead wiring		\$262,381
Meters		164,560
Station "B"		400,000
Sub-stations, Nos. 1 to 7		293,379
Station "C"		690,050
Buildings, Sub-stations Nos. 1 to 7		91,992
Underground conduits		150,000
	<hr/> \$1,815,813	<hr/> \$2,052,362

Joint Property.

Office building, Sutter street	\$50,000
Office building, Post street, and contents,	100,000
Branch office buildings, and contents	5,000
Warehouse and contents	250,000
	<hr/> \$405,000

Summary.

Gas Department	1,815,813
Electric Department	2,052,362
Joint Property	405,000
	<hr/>
Total	\$4,273,175

1251 This is identically the same as the memorandum which you just showed me, Mr. Britton, with the exception of the joint property difference to which you referred. Will you state, first, how that difference in joint property arose?

A. I don't know that I can tell you at this long-distant date, but my assumption is that the first figures I made as to the values of the property were subsequently changed by a more extended review of their values.

Q. Referring to the memorandum you had with you this morning, which of the items of joint properties as shown in this statement are higher in your memorandum?

A. The Sutter street office building I had penciled at \$150,000

value, and I reduced that to \$50,000. The office building on Post street I had put down at \$300,000 and it was subsequently reduced to \$100,000. They are the only two items in the joint property account which were changed.

Q. How was this memorandum made up, Mr. Britton? Was it made on the basis of the books, or was it made on the basis of a valuation of the lost elements of the plant?

A. Both. Take the first item of gas meters and connections, that was determined positively from the book of consumers, it was determined that we had that number of gas meters of varying sizes in the burned district.

Q. How did you determine the figure of \$499,945?

A. By a computation on the different sizes of meters and the connections and the value of them at the time of the destruction.

1252 Q. Do you know who made that valuation?

A. I made it on information furnished to me as to the number of meters that were destroyed.

Q. And the value figures were made by you?

A. Made by me, yes.

Q. If you divide the sum of \$499,945 by 36,663, which was the number of gas meters and connections, you get an average price of about \$13.70 per meter with connections?

A. Yes.

Q. Referring to the Jones inventory in this case, a similar average gives us \$7.90 as the reproduction cost today of these meters.

Mr. Bosley: Is that meters alone, Mr. Searls, or meters and connections?

Mr. Searls: Meters and connections.

A. For the entire city, Mr. Searls?

Q. Yes.

A. It must be borne in mind, in that connection, Mr. Searls, that the burned district included the larger consumers of gas, requiring larger installation of meters, and it would not be proportionate to the entire city where in the outside districts there were the smaller sizes at a lower cost. That accounts for the higher average price for those meters.

Q. Was this intended to be a reproduction cost new of these meters, or was it an estimate of their value in their depreciated condition?

1253 A. My best judgment now would be that it would be the value of these meters in their position, taking an average value.

Q. And taking into account that many of them must have been in a depreciated condition?

A. Yes, I would assume that that would have been the way I arrived at it.

Q. Mr. Jones' figures are reproduction cost new?

The Master:

Q. Did you arrive at this figure of \$499,000 by taking an average, or did you estimate according to sizes?

A. I estimated according to sizes.

Q. And you have not preserved your estimates?

A. No, I have not; I have not the detail of the different sizes of meters at all.

Mr. Searls:

Q. Have you any recollection as to the percentage condition that you found those meters in at the time?

A. I have not.

Q. No memorandum which would enable you to state that?

A. No, I will say that that was not arrived at entirely by myself, as I intimated; Mr. Jones was called into consultation with me at the time to determine the value. The memorandum that went to make up that gross amount I have not, of course, preserved.

Q. You had a J. G. White inventory of your properties made prior to that, had you not?

A. Yes.

Mr. Bosley:

Q. Prior to that?

1254 A. Well, about that time.

Mr. Searls:

Prior to 1907, when this was made.

Mr. Bosley:

Q. What is the fact about that, Mr. Britton?

A. I am trying to recall that. My Memory does not serve me as to just when they began that.

Mr. Bosley:

My impression is that the J. G. White inventory and appraisalment was made in 1911 or 1912, and I think was brought down to December 30, 1912.

Mr. Searls:

Oh, yes, you had one then, but there was one prior to that.

Mr. Bosley:

There was one prior to that, at about the time of the purchase of the stock of the San Francisco Gas & Electric Company, but that was not a complete inventory and appraisalment.

The Witness:

Oh, no, it was a review of the property; it was in detail, but not as the one that was made subsequently.

Mr. Searls:

Q. Are you quite sure you did not accept the J. C. White figures on the question of the meters, Mr. Britton?

A. I am very positive about that. I made appraisements of properties before, Mr. Searls, and I did not usually taken anybody else's word for values.

1255 Q. But you might have been influenced by it.

A. I think my experience was greater than J. G. White & Company's at that time.

Q. With respect to the gas holders at Fifth and Howard, do you know anything about their condition at the time of the fire?

A. I know they were there. I could not testify I knew their absolute condition, no, sir.

Q. You are quite sure they were worth \$300,000 at the time that you made this appraisal, however?

A. I am sure that my judgment was that prior to the fire they were worth that amount.

Q. Mr. Jones, on the preliminary hearing in this case, made an affidavit in which he referred to the gas holders at Fifth and Howard which were destroyed by the earthquake of 1906; in that affidavit he said: "Had they not been destroyed they would have become obsolete, because of the undesirable location of the holders for distributing purposes; the investment represented by these holders originally was \$180,000; an accrued depreciation in 1906 amounted to 30% of their original cost. The balance chargeable to obsolescence and contingent losses was the sum of \$126,000." Is it your opinion that Mr. Jones was in error in making that affidavit?

A. Only a difference in judgment, I assumed, about that.

Q. That is a difference of something over 100% in judgment.

Mr. Bosley: I think this was intended practically as a reproduction valuation as it was used for the purpose of making a deduction from the purchase price of the property. If we have the figures too high, we have depreciated our property too much in the statement we have put in. I have not inquired of Mr. Britton what his basis of valuation was, whether on the basis of what the property cost new, or whether he took into consideration depreciation.

Q. Can you state positively about that, Mr. Britton?

A. No, I cannot. I think in the case of gas meters I did take the probable depreciated value. I have an idea about the depreciation, and always have had, that it is negligible while the apparatus is in service. I could not tell now, after a lapse of ten years, just what I thought at that time, excepting that from my knowledge of the value of the holders I estimated them as of that value prior to the fire.

Mr. Searls:

Q. Is it not probable you failed to take into consideration the fact that they were in a depreciated condition and figured merely their reproduction value? It was not always the custom to account for depreciation at that time, was it?

A. It was an item.

Q. Are you quite sure you did take into consideration the fact that they were depreciated?

A. No, I am not; I say I don't remember my state of mind with reference to that fact at that time. As to the meters, I think I would have done that; as to the holders, I don't think I would have depreciated them at all. My experience with holders and 1257 also with gas mains is that they are not depreciated while they are in service, they become depreciated when they are withdrawn from service.

Q. It is a fact, however, that the company had been carrying depreciation reserve long prior to that, is it not?

A. That I don't know, as to the San Francisco Gas Company.

Q. Did you ever see any of Mr. Bourne's reports to the stockholders of the San Francisco Gas & Electric Company, reports made prior to that date?

A. Yes. I have

Q. Do you recall whether or not he stated that there was a considerable depreciation fund set up?

A. I don't recall that.

Q. His reports show that in 1903 there were \$200,000 set aside for the gas department alone, and in 1904 \$400,000. Now, if that were a fact, would it not be necessary to take into account the depreciated condition of this plant, so that your balance sheet would show correctly what you had?

A. I don't know how that was treated in the account. I have no idea about that, whether that was a part of the accounts, or whether it was a mere statement made without reference to the books of account. I don't know whether that was set up as an item of depreciation, or not.

Q. It was shown in the Municipal Report for that year as an amount carried. But outside of that, Mr. Britton, you have carried these fire loss estimates into your study of original costs as shown in Plaintiff's Exhibit No. 17 for what they are worth. Now, 1258 if you had been carrying depreciation, for instance, on a straight line basis in those early years, and had not depreciated your property accordingly, you would be showing too high a property value today, would you not, by taking in these fire losses at their reproduction value new, if you did that?

A. That is true, yes.

Q. And you are not sure whether you did it or not?

A. I don't know anything at all about their method of handling their books prior to 1906.

Q. Referring to this item of the North Beach station, which I note you have carried at \$750,000, Mr. Jones states in the affidavit

to which I have referred, that the amount of investment represented by that portion of the plant which had become obsolete at the date of the destruction, was approximately \$660,000. Did you take that into account, or are you sure you took that into account when you reached that figure? He states in another place that the total investment represented by the plant was approximately \$1,054,000.

Mr. Bosley: What is that taken from, Mr. Searls?

Mr. Searls: Mr. Jones' affidavit on the preliminary hearing in this case.

The Master: Mr. Britton's figure here is \$750,000.

Mr. Searls: \$750,000. I believe it is conceded that there is still a portion of that plant out there which is included in the Jones inventory, that is, a holder, isn't there, Mr. Britton?

A. Oh, yes.

1259 Q. If there was \$660,000 worth of obsolete property there, and the holder is still existing, which is appraised—or, rather, a total property still there which is appraised in the Jones inventory at \$273,884, that would leave about \$100,000 of original investment which could have been lost in the fire on Mr. Jones' theory, and you have appraised it at \$750,000. That is another instance of quite a difference in opinion.

A. That is all it amounts to, Mr. Searls, the independent judgment of engineers.

The Master: One is cost and the other is not.

Mr. Searls: I appreciate that, your Honor, still there is a margin of nearly six times the figure which Mr. Britton gives us.

Mr. Bosley: You are taking into consideration the supposed accrued depreciation due to obsolescence in getting that.

Mr. Searls: No. Mr. Jones says the amount of investment represented by that portion of the property which had become obsolete; in other words, I assume by that he means it was worth nothing except the scrap value.

Mr. Bosley: That is a part of the property that was destroyed, wasn't it?

Mr. Searls: Yes, but it was obsolete at the time it was destroyed, according to his statement.

Mr. Bosley: I think if you take his testimony in connection with other parts of it—and he has testified here that the works out
1260 there, some of which were entirely new, had not yet been used, were obsolete because of the developmmt of the Jones process, but they were in actual use and had been in actual use up to the time they were destroyed, not that they were out of use prior to destruction on April 18, 1906.

Mr. Searls: If you will permit me I will read his entire statement in reference to the North Beach station.

The Master: That is dated as of what time?

Mr. Searls: This was an affidavit made on the 17th day of January, 1914, by Mr. E. C. Jones. Speaking of the North Beach plant he said:

"This plant consisted of two Springer water gas sets of one million cubic feet capacity each, erected in 1891, and the first gas was made January 18, 1892. In 1894 a complete coal gas works was erected, consisting of 20 benches of 9 retorts each. In 1903 two Lowe water gas generators were added to the plant. On April 18, 1906, this plant was entirely destroyed by earthquake, but at that time it had become obsolete, with the exception of the two-million-foot gas holder and set of purifiers, three scrubbers and some portions of the plant now used in connection with these works as a distributing station. The amount of the investment represented by that portion of the plant which had become obsolete was approximately \$660,000."

Mr. Bosley:

Q. Mr. Britton, was that plant that Mr. Jones referred to as being obsolete actually in use up to the time of its destruction
1261 in April, 1906?

A. Yes, it certainly was.

Mr. Searls: And a little later he says:

"At the time of the earthquake in San Francisco, in 1906, the North Beach station of the San Francisco Gas & Electric Company and the plant of the Pacific Gas Improvement Company were equipped with apparatus for manufacturing coal gas and water gas solely, and these plants were not readily adaptable to the manufacture of oil gas; therefore the value of the buildings and other apparatus at these points has been included in the amount of obsolescence."

I think that Mr. Jones has stated, and would be willing to state, that the manufacture of coal gas at that time had become more or less uneconomical, due to the difficulty of getting coal in San Francisco, which, in turn, was the result of the elimination of the wheat-carrying ships between San Francisco and Australia when California went out of the wheat business virtually.

Mr. Bosley: We will admit that that was the fact, Mr. Searls.

The Master: That is, 1906, that you are speaking about?

Mr. Searls: Yes.

Mr. Bosley: And those plants down there that he has referred to as obsolete were the plants that were still in use and were the actual source of the supply of gas for San Francisco.

1262 The Witness: Yes, with the exception of some of the coal gas benches.

Mr. Bosley: And some of the new benches there, I think, never had been fired.

The Witness: No.

1263 Mr. M. H. BRIDGES, a witness recalled for the plaintiff, testified in substance as follows:

Sheet 17 of Exhibit No. 58 is a statement showing the revenues, expenses, dividends and other statistics of the gas business of the

San Francisco Gas Light Company, the San Francisco Gas and Electric Company and the Pacific Gas and Electric Company in San Francisco from April 1, 1873, to December 31, 1916.

The first three columns on sheet 17 under the general heading "Revenue" show separately the total amount of revenue derived from the sale of gas, revenue from the sale of by-products and miscellaneous items, and the gross revenue from both sources.

The next four columns show the amount of the expenses incurred in the gas business (exclusive of reserves or special charges for depreciation) for the same period of time, such expenses being segregated into manufacturing and distribution expense, taxes, etc. The total expense for each year, exclusive of special charges or reserves for depreciation, is shown in the next column. In succeeding columns are shown the amounts of special charges and reserves for depreciation, obsolescence, etc., and the net income after the deduction of special charges and reserves for depreciation, etc. The 1264 sources from which said sheet 17 of Exhibit No. 58 has been compiled are as follows:

For the period from 1873 to December 31, 1896, the records of the San Francisco Gas Light Company; for the period from January 1, 1897, to December 31, 1911, the books and records of the San Francisco Gas and Electric Company; and for the period from January 1, 1912, to December 31, 1916, the books and records of the San Francisco district of the Pacific Gas and Electric Company.

The amounts shown in the column headed "Decrease in Plant and Depreciation" for the period from January 1, 1912, to December 31, 1916, represent estimates which were made at the time when these suits were commenced. During the period from January, 1912, to December 31, 1916, the Pacific Gas and Electric Company did not set up a separate depreciation reserve for its San Francisco gas department properties.

The amounts shown in the column under the heading "Insurance and Contingencies" as a part of the gas department expense appear to represent actual payments except during the years 1901 to 1903, inclusive, and from 1908 to 1916, inclusive, when the amounts shown are the amounts of reserves set up on the books or estimated for the purpose of these cases.

The amounts shown in the column headed "Miscellaneous Expense" include the amounts written off for bad debts, or uncollectible accounts.

1265 The column headed "Decrease in Plant and Depreciation" contains the amounts deducted from income for actual abandonments or reserves for depreciation. The amounts shown in this column for the year 1897 to 1911, inclusive, represent reserves set up on the books of the San Francisco Gas and Electric Company. At December 31, 1905, the amount of the San Francisco Gas and Electric Company's depreciation reserve for both gas and electric departments which remained unexpended was the sum of \$378,894.69 and was at that time transferred to surplus. During the years 1905 and 1906 no reserves for depreciation were set aside on the books of the

San Francisco Gas and Electric Company. The reserves shown on sheet 17 of Exhibit No. 58 from January 1, 1907, to and including December 31, 1911, are the amounts which were actually set up on the books of the San Francisco Gas and Electric Company. The amounts shown as reserves for the period from January 1, 1912, to December 31, 1916, are estimates and do not represent amounts actually reserved or set apart on the books of the Pacific Gas and Electric Company. (NOTE.—Net charges for current depreciation from 1896 to 1905 are not disclosed by the record.)

The following table showing the gross revenues, expenses, actual net charges for current depreciation, reserves actually set aside on the books for depreciation, and net income before depreciation, net income after deduction of net depreciation charges and net income after deduction of depreciation reserves has been compiled from sheet 17 of plaintiff's Exhibit No. 58 except as otherwise noted therein.

(Here follows paster table marked page 1266.)

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623,39
617,29
639,79
511,92
497,91
333,76
357,28
566,15
,202,31
,226,90
576,42
577,66
680,89
902,55
,067,40
,106,21

487,86

Statement of Gross Revenues and Costs, San Francisco Gas Department, for the Years 1896 to 1

1	2	3	4	5	6	7	8
			Expenses.			Net income	Net c
Year.	Gross rev., gas, and by-products.	Manuf. and distribution.	Taxes.	Insurance & contingent.	Miscel.	before deprecia- tion charges or reserves.	for cur preciat
1896.....	1,368,678 10	678,768 65	49,434 25	8,980 00	8,160 00	745,342 90	623,335 20
1897.....	1,380,680 39	712,497 23	44,565 90	785 70	5,533 75	763,382 48	617,297 91
1898.....	1,455,572 61	766,577 89	44,100 90	675 53	420 35	815,774 67	639,797 94
1899.....	1,392,834 82	821,439 43	58,811 17	656 08	.....	880,906 68	511,928 14
1900.....	1,306,411 74	741,838 26	66,284 14	377 33	.....	808,499 73	497,912 01
1901.....	1,265,113 06	839,536 84	58,621 08	25,237 39	7,952 15	931,347 46	333,765 60
1902.....	1,151,466 83	703,903 47	47,183 57	39,300 13	3,792 96	794,180 13	357,286 70
1903.....	1,474,672 34	814,184 25	50,006 40	25,076 90	19,253 49	908,521 04	566,151 30
1904.....	2,510,652 95	1,195,142 17	76,789 14	251 21*	36,657 23	1,308,337 33	1,202,315 62
1905.....	2,552,911 62	1,218,286 73	81,162 03	.....	26,559 81	1,326,008 57	1,226,903 05
1906.....	1,899,824 04	1,206,808 22	67,391 70	6,532 46	42,667 04	1,323,399 42	576,424 62
1907.....	2,076,673 88	1,418,438 86	54,334 74	4,850 64	21,386 38	1,499,010 62	577,663 26
1908.....	2,361,651 73	1,536,403 09	71,685 80	42,677 36	29,988 40	1,680,754 65	680,897 08
1909.....	2,676,784 19	1,606,559 73	96,660 12	42,920 77	28,084 67	1,774,225 29	902,558 90
1910.....	2,814,852 64	1,561,234 15	118,699 23	43,205 46	24,307 73	1,747,446 57	1,067,406 07
1911.....	2,820,531 68	1,566,221 21	122,868 49	5,198 00	20,025 03	1,714,312 73	1,106,218 95
Totals....	30,509,312 62	17,387,840 18	1,112,598 66	246,222 54	274,788 99	19,021,450 27	11,487,862 35

(a) Exhibit 72, Page 7.

(b) " 82.

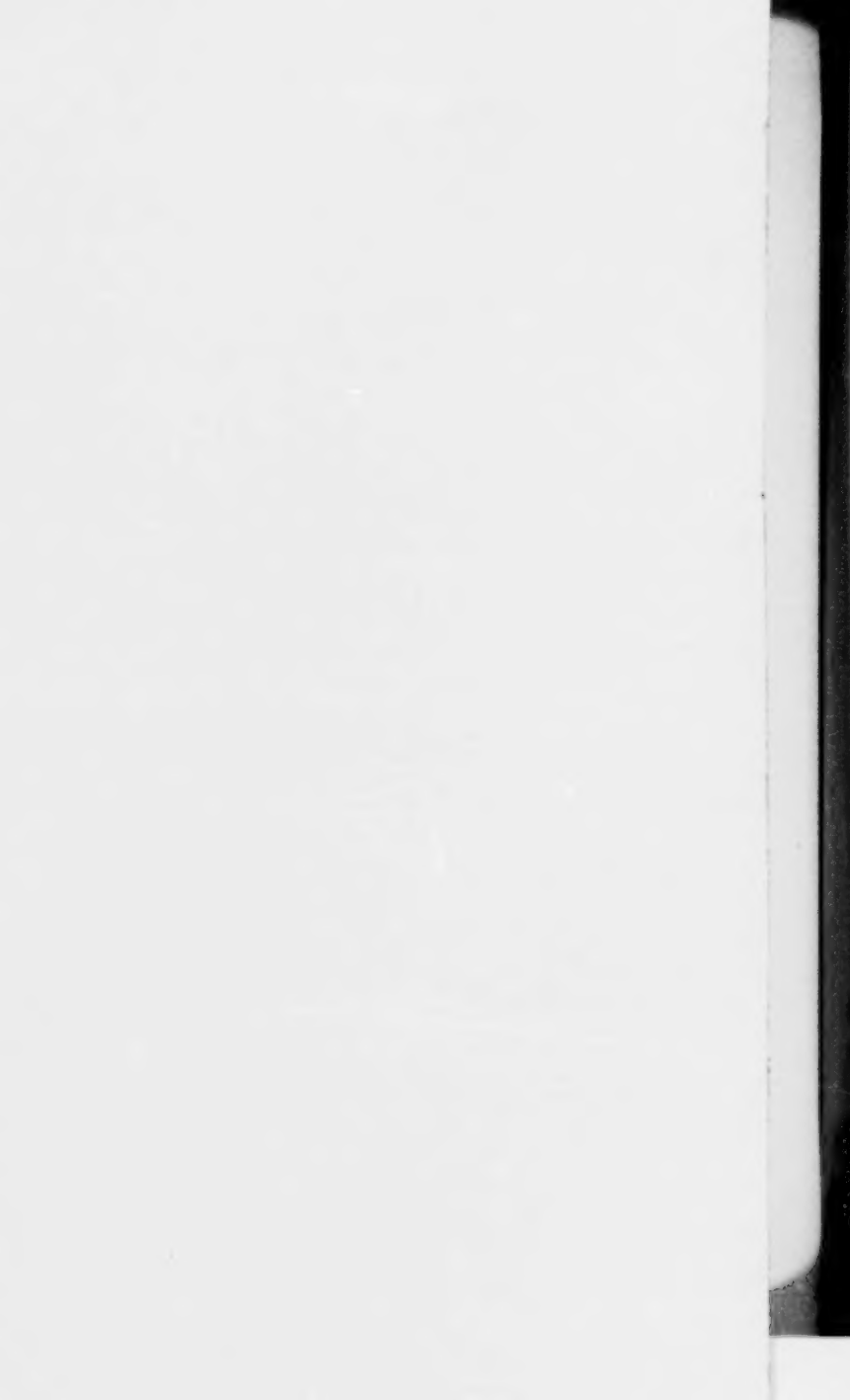
(c) " 91, Page 1.

[*In red in copy.]

Issued by Auditing Department, San Francisco.

Statement of Gross Revenues and Costs, San Francisco Gas Department, for the Years 1896 to 1911, Inclusive.

	3	4	5	6	7	8	9	10	11
		Expenses.			Net income before deprecia- tion charges or reserves.	Net charges for current de- preciation, etc.	Net income after current de- preciation, etc.	Reserves for de- preciation, etc.	Net income after deducting reserves for de- preciation, etc.
and on.	Taxes.	Insurance & contingent.	Misc.	Total.					
65	49,434 25	8,980 00	8,160 00	745,342 90	623,335 20	.....	623,335 20	.....	623,335 20
23	44,565 90	785 70	5,533 75	763,382 48	617,297 91	.....	617,297 91	36,000 00	581,297 91
89	44,100 90	675 53	420 35	815,774 67	639,797 94	.....	639,797 94	36,000 00	603,797 94
43	58,811 17	656 08	.....	880,906 68	511,928 14	.....	511,928 14	36,000 00	475,928 14
26	66,284 14	377 33	.....	808,499 73	497,912 01	.....	497,912 01	36,000 00	461,912 01
84	58,621 08	25,237 39	7,952 15	931,347 46	333,765 60	.....	333,765 60	36,000 00	297,765 60
47	47,183 57	39,300 13	3,792 96	794,180 13	357,286 70	.....	357,286 70	104,550 59	252,736 11
25	50,006 40	25,076 90	19,253 49	908,521 04	566,151 30	.....	566,151 30	175,000 00	391,151 30
17	76,789 14	251 21*	36,657 23	1,308,337 33	1,202,315 62	.....	1,202,315 62	400,000 00	802,315 62
73	81,162 03	.....	26,559 81	1,326,008 57	1,226,903 05	.....	1,226,903 05	.....	1,226,903 05
22	67,391 70	6,532 46	42,667 04	1,323,399 42	576,424 62	a345 00	576,079 62	.....	576,424 62
86	54,334 74	4,850 64	21,386 38	1,499,010 62	577,663 26	a77,981 13	499,682 13	371,710 43	205,952 83
09	71,685 80	42,677 36	29,988 40	1,680,754 65	680,897 08	b122,765 00	558,132 08	c636,838 00	44,059 08
73	96,660 12	42,920 77	28,084 67	1,774,225 29	902,558 90	b94,152 31	808,406 59	c636,838 00	265,720 90
15	118,699 23	43,205 46	24,307 73	1,747,446 57	1,067,406 07	b101,062 38	966,343 69	c636,838 00	430,568 07
21	122,868 49	5,198 00	20,025 03	1,714,312 73	1,106,218 95	b125,270 58	980,948 37	c631,671 26	474,547 69
18	1,112,598 66	246,222 54	274,788 99	19,021,450 27	11,487,862 35	521,576 40	10,966,285 95	3,773,446 28	7,714,416 07



1267

Evidence Introduced by Defendants.

Mr. FREDERICK C. GRIMSHAW, a witness recalled for the defendants, testified in substance as follows:

I have compiled a statement based on my study of the books of the San Francisco Gas and Electric Company beginning with the year 1908 and ending at November 27, 1911, and of the books of the Pacific Gas and Electric Company from November 27, 1911 to June 30, 1916. The items contained in this statement have been correctly transcribed from the books and records of those companies. (The statement prepared by the witness was here admitted in evidence and marked "Defendant's Exhibit No. 91").

The only part of this exhibit which it deemed necessary to insert in this statement is page 1, a true copy of which is as follows:

1268

Pacific Gas and Electric Company.

Summary of Charges for Accrued Depreciation, Reserves For Depreciation, and Balance of Reserves Unexpended.

Years 1908 to June 30, 1916.

San Francisco Gas District.

	Total accrued depreciation.	Reserves for depreciation.	Balance.
Year Ending December 31, 1908.....	122,765.00	636,838.00	514,073.00
Year Ending December 31, 1909.....	94,152.31	636,838.00	542,685.69
Year Ending December 31, 1910.....	101,062.38	636,838.00	535,775.62
Year Ending November 27, 1911.....	107,771.62	631,571.26	523,899.64
	<hr/>	<hr/>	<hr/>
Balance of Reserve for Depreciation Unexpended.....	425,751.31	2,542,185.26	2,116,433.95
			<hr/>
			\$2,116,433.95

NOTE.—This Balance was transferred to the Pacific Gas and Electric Company by San Francisco Gas and Electric Company, in consolidation, November 27, 1911. The Pacific Gas and Electric Company consolidated this amount with other reserves and funds transferred, under caption "Consolidation Surplus," aggregating \$7,884,853.40. This "Consolidated Surplus" was used December 31, 1911, in writing off \$18,341,519.52 from "Rights, Goodwill, etc," and other accounts against which Common Capital Stock had already been issued by the Pacific Gas and Electric Company.

	Total gross depreciation.	Salvage.	Net de- preciation charged to reserve.
Month of December, 1911.....	.....	.....	17,498.96
Year Ending December 31, 1912.....	.....	.....	70,013.83
Year Ending December 31, 1913, (including North Beach Plant).....	104,421.54	33,252.88	586,369.24
Year Ending December 31, 1914.....	104,638.46	45,898.70	57,085.79
Year Ending December 31, 1915.....	478,932.36	60,794.31	414,764.43
Six Months Ending June 30, 1916.....	104,608.48	38,087.31	64,269.35
	<u>792,600.84</u>	<u>178,033.20</u>	<u>1,210,001.60</u>
Total of Net Depreciation, San Francisco Gas District, Charged to Reserve.			
Year Ending December 31, 1908, to November 27, 1911.....	.....	.....	425,751.31
Month Ending December 31, 1911, to Six Months Ending June 30, 1916.....	.....	.....	1,210,001.60
Total .....	.....	.....	<u>1,635,752.91</u>

1269 Page 1 of Exhibit No. 91 is a summary of the charges for accrued depreciation and the amounts set aside for a depreciation reserve, and also shows the balance of reserve unexpended. This statement has to do only with the depreciation expenditures and reserves for the plaintiff's San Francisco Gas Department. Two items in the column entitled "Net Depreciation charged to Reserve," namely the items for 1913 and 1915, require explanation. The item for 1913 includes, in addition to the current charges for realized depreciation, an item of \$519,380.00, which was written off in that year because of the destruction of a part of the San Francisco Gas and Electric Company's North Beach plant which occurred in 1906. The item for 1915 includes, in addition to the current charges for Realized Depreciation, an item of \$244,654.75 for gas mains which had actually been abandoned long prior to that year.

Mr. N. RANDALL ELLIS, a witness called for the defendants, testified as an expert with respect to depreciation and its relation to present value or the rate base and the provision which should be made for accruing depreciation. This testimony, in which the total amount of accrued depreciation and the annual allowances to be made for accruing depreciation are treated together, is contained in this statement on pages 223-396.

Upon this same subject, Mr. Ellis further testified on direct examination conducted by Mr. Searls as follows:

You asked me to examine into the question of the amount of obsolescence that should be allowed based on the showing in Plaintiff's Exhibit No. 58. The items there that I was referred to were on pages 16A and following and presumed to cover obsolescence, inadequacy and contingencies. In the first place, I think some differentiation should be made and probably has been in later exhibits between the item of the extraordinary casualty of 1906 and the element of functional depreciation. There seems to be, as I gleaned from the presentation, the idea that the aggregate of those abandoned plants which were listed there were due to changes in the art and consequently that the total estimated value of them should be charged off as against obsolescence. I think that primarily that premise is wrong. Under my conception, on any experience I have had, or anything I have ever read or heard of those plants could not have been in a 100 per cent physical condition at the time they were abandoned. I mean if the whole value of a plant—citing for instance the North Beach Plant, if the North Beach Plant had a value of \$1,100,000, when that was written off it was an indication of \$1,100,000 obsolescence: That would presuppose that that plant at the time of writing off was in 100 per cent physical condition. I have had experience personally with a large range of different properties.

I have looked into the subject elsewhere also and I cannot
1271 personally conceive of any property having been in operation for a long period and being in 100 per cent physical condition. It might be in 100 per cent service condition, I mean it might be giving 100 per cent service when you measure service

like ordinary operating service, not meaning that it would give as much service as it would under a test; I mean just under ordinary operating conditions. Take the Pacific Gas Improvement Plant, which is included in that study in Exhibit 58, from the history of that plant we know that coal gas ceased being made in 1901; the coal gas benches were never used after that date and the plant itself was shut down in 1903; at 1903 or at 1904, or at any time to 1906 I should imagine that the plant—and it would be extremely liberal, though I am not familiar with the condition of the plant, but from its history and so on I should imagine it would be an extremely liberal allowance to say that the plant was in 60 per cent physical condition. I have had this experience, not with gas plants, but with other plants; plants or portions of equipment that are not in use, that are set aside, rapidly deteriorate in value; I believe Mr. Jones bears me out on that in his discussion of Martin Station and makes a large allowance accordingly. Consequently, as I say, using a reproduction value as a criterion for obsolescence in those cases I think is an error.

Secondly. I think the study seems to indicate that those figures are more or less controlling on an obsolescence allowance. There is of course the fact—I don't know whether it has been corrected since, or not—that of the amount used there parts of those
 1272 were not lost through obsolescence, parts of them were transferred; two of the sets from the Equitable plant—water gas sets, are at present installed in the Independent; and from the Pacific Gas Improvement Plant the two sets—from what I can learn and from a report by Mr. Bourne at the time—were transferred to the Independent Plant, the Independent Plant originally as built by Mr. Hunt having had two water gas sets with room for six; after the merger they filled up the spaces apparently with these sets. Furthermore, the holder at the Equitable we happen to know from information Mr. Jones has given us is in service today as an oil tank at the Independent. How much more equipment of that character was transferred, I do not know. Taking the appraisals of those plants as they stood is no indication of obsolescence. While I do not think that much information can be gained from looking over partially abandoned plants as an indication of future obsolescence, if anyone is inclined to a study of that character I think the only logical thing, speaking from an engineer's standpoint, that would give an engineer any idea of the subject would be, if the records were in such shape that you could make a complete compilation of your losses due to functional depreciation during the history of the life of the company over a long period of years; having determined that figure see its relation to the capital in vestment during those years. It might afford some criterion, although I doubt it—it would afford more
 1273 information as to the possibility of obsolescence, or how much of it entered into the consideration of the capital investment than picking out fragmentary portions and applying them over a short term of years.

Q. In your conception did Mr. Bridges' study as set forth in his Exhibit 58 and subsequent exhibits furnish a basis on which such a study could be intelligently predicated by an engineer?

A. I could not; the information was by far too incomplete and involved too many elements; as near as I could conceive it, he started in 1906 with property that he called abandoned and obsolete at 1906; some of it was abandoned and obsolete in 1901 and some of it at later periods. Some of it is not abandoned or obsolete today, it is in existence. Then, as I understand it, he attempted to distribute that, together with certain fire losses and casualty losses, over a period of 10 years or different periods. However, I cannot see that that affords any particular indication as to the progress of obsolescence. While I cannot see the particular necessity for differentiating between the physical and functional depreciation there is a method which has been used which probably more closely approximates the facts than a mere compilation of figures from the books, which are from an auditing standpoint and that is that estimates have been made by engineers as to the probable physical life of properties; then they would estimate the foreshortening of that life probably due to obsolescence; they would determine then what the loss in value was due to this foreshortening and amortize along those lines.

1274 That method though involves considerable speculation. The only object of it would be if anyone was concerned in seeing how much of a depreciation allowance should be for functional depreciation and how much for physical depreciation. As the question both of physical depreciation and functional depreciation involves the use of an estimate I personally prefer the composite useful life.

Q. Do you see any significance in using a period of 10 years? Mr. Bridges did for amortizing such obsolescence?

A. No sir. As I understand it, the period of 10 years was used to amortize not only the so-called obsolescence and inadequacy, but also contingencies and casualties and the conflagration of 1906. I do not personally think that if an amortization were to be provided for any such extraordinary casualty as that of 1906 it should be limited to any such short term as 10 years. In other words, we have not much comparable history on the subject. The large damage to the company was not done by the fire, it was by the earthquake. The plants controlled by the company at the time, that is the generating plants, were not touched by the fire. The damage was an earthquake damage; the mains were principally damaged because of the earthquake. The lamp posts were fire damaged, and I believe the holders at 6th and Market, and the office buildings, and so on. As far as the earthquake goes, we had not had a heavy shock in San Francisco, that is, one that did any material damage, since 1868. That was an interval of 38 years. I figured, roughly,

1275 that assuming an estimate made of fire loss—which I understand is made on a valuation undepreciated, and that is on information from counsel, and I presume that should be amortized,—that amounted to a figure something over two million dollars; if you assume that you will have a loss at intervals of 38 years, and you set up a fund on a sinking fund basis to amortize that, it would amount to in the neighborhood of \$19,000. I made an estimate on it. In other words, if you set up \$19,000 as insurance against \$2,000,000 loss, assuming that it came at intervals of 38

years, it would amortize it. If the loss was based on reproduction cost of structures, and so on, the loss was not \$2,000,000 but was as much less than \$2,000,000 as those plants had physically deteriorated.

There was one other matter in connection with that study that I noticed, and that was the write-off of dead mains as being indicative of obsolescence or inadequacy. Of course, as to a writing off of dead mains, no details have been shown; the list compiled from the company's maps shows mains that may have been dead 10 or 15 years; the company claims no valuation for them in the Jones appraisal; they are simply listed as dead mains when they are discovered as dead mains, or when they have been cut off. This point occurred to me: I made a study a couple of years ago in connection with these dead mains, that is, in connection with the whole subject of mains. Those dead mains largely, as I recall it from my study, were not due to the fact that they were inadequate mains, which

1276 were supplanted or superseded by larger street mains; they were mains which were cut out through mergers; where there had been an accumulation of mains in the streets. If they had not been cut out and had appeared in this valuation we would have cut them out under our contention as to duplication. I believe it has been testified that mains of that character are cut out. I think that constitutes, as I recall it from my study, the greater bulk of the dead mains. In so far as that is true, the write-off of matter of that kind is not indicative of obsolescence or inadequacy, but is simply indicative of an over-acquisition of property on consolidation.

Q. Would that feature apply to mains alone, or would it have any bearing on the generating plants that were abandoned—and some of them burned up?

A. I have seen no evidence of it, and I have not attempted to make a compilation myself on the relation of the combined catastrophe on all the plants as compared with the demands of the city at that time. I understand that the coal benches were practically obsolete and not in use. As I say, as to what extent the balance of the structures would be a duplication for a merged company I have not made sufficient study and have not the facts available to answer that in detail.

Q. If it should turn out that there was a duplication there would a depreciation allowance based on the amortization of an investment of that type be a fair indicative of future requirements?

A. No, I think it is a question that is not to be considered 1277 by lumping all written-off property, whether it comes through an extraordinary casualty, through functional depreciation or through over-built plant due to mergers. If a study is to be made on the subject I think it should be made on some definite line as to what experience has shown over a term of years as to the necessity of actual depreciation. I think the safest basis is to attempt to make a study, as we have done in our case, and see what the probable useful lives are as applied to existing property; and there will be variations—you can pick out an individual element that we say will expire in 25 years, it might expire in 20 or it might expire in 30;

however, if you go through a large group with the care that we did and bring to bear all the information that we could get a lot of those small variations I think will be more or less compensating. While on our estimates of the probable lives there may be fluctuations back and forth I think on the whole they are representative.

Q. There is one other question, and that is with respect to reserves which have been carried by the company in the past: In your opinion how should they be treated with respect to accrued depreciation?

A. I was preparing some matter on the question of depreciation reserves as they have been carried by the company in the past in connection with the studies that I intended to present on working capital and development expense, and so on, but I have not completed those figures yet; I will bring them in later. In 1278 general the condition has been this: The first attempt at setting up a reserve of any consequence was in 1902, under the Bourne regime; that had accumulated up to a considerable amount by 1905 and then was written off to surplus; as to whether that surplus was subsequently used as against the fire loss I don't know; I have not followed through the accounts; at the same time there was an insurance reserve, that is, for insurance, accidents and damages set up which apparently was not written off, from such information as I have from the books, until somewhere in 1907; that amounted to some \$140,000 or \$150,000. As to the disposition of that, I have not been able to determine that yet, but I will before I complete my study. The company again started depreciation reserves in 1908 and, as set forth by Mr. Grimshaw's Exhibit yesterday, developed a surplus in that reserve by the end of 1911 of some \$2,100,000. Starting at the same time in 1908, the San Francisco Gas and Electric Company built up reserves in its electric department, the aggregate surplus for both gas and electric in 1911 approximating somewhere in the neighborhood of \$3,900,000 or \$4,000,000. Those balances were transferred to surplus and a corporation reserve set up of somewhere in the neighborhood of \$2,500,000, which was less than the aggregate surplus of the San Francisco Gas Company alone.

Q. And that reserve was set up for the entire system, wasn't it?

A. Yes, for the entire system. I have not completed the study as to the effect of that procedure. Of course, it looks to me, 1279 and I understand it is imperative according to the ruling of the Railroad Commission now, that moneys that are dedicated to a reserve, or set up on the books as a reserve for depreciation must be preserved more or less sacred if they are obtained from the rates. A transfer of those depreciation reserves to surplus,—they lose their identity; they may be the basis of declaring dividends, or anything at all after that. I think the present tendency is that reserves of that character should be kept in the reserves. However, that has no particular bearing on the question that you asked me.

The Master :

Q. By the way, Mr. Ellis, do you mean that under the Commission's rule the depreciation reserve cannot be invested in plant?

A. Oh, no, I didn't mean that at all. I mean you cannot transfer it to surplus.

Q. You mean that its integrity must be maintained as a reserve on the books?

A. Yes, its integrity must be maintained as a reserve on the books. The criticism I was offering was that with an accumulation of \$4,000,000 reserve between 1908 and 1911 the San Francisco Gas & Electric Company transferred that to surplus and it loses all its identity and a system reserve of considerably less and covering the whole system is set up. It might have been permissible at that time, I don't know; it looks as though that instead of writing it off to surplus it should have been preserved. I have not followed the study throughout; I will bring that to a close later on.

1280 Q. Is there a section of the Railroad Commission's regulations dealing with that?

A. Yes, sir, there is. The Commission's classification substantially involves if you are setting up a reserve beginning at a certain date, say at the beginning of 1908, that that reserve is presumed to be used for the property existing then in its present value; in other words, that in setting up a reserve of that character you are not permitted to charge against it the property that may have expired, or a large part of whose value may have expired prior to the setting up of the reserve, their intent apparently being that if reserves are carried along in this method for a number of years the balances will form some indication as to the condition of the property; in other words, they are not to be dumping ground for property that is dead in the past but that such property has to be charged against a special fund which in turn is written off against surplus. That is my interpretation of the rule.

Mr. Searls:

Q. Mr. Ellis, at the last hearing at which you testified you stated that you would examine the reserves actually set aside by the Pacific Gas and Electric Company with a view of determining exactly what surpluses remained after the books were closed from one company into another; have you made this investigation?

A. Yes, I have made that investigation as far as the period
1281 immediately preceding 1906 is concerned and a compilation of the results since 1906.

Q. Will you state the results of your investigation?

A.—

Depreciation Reserves.

In the period prior to 1906, annual depreciation reserves had been set up as follows:

Gas Dept 1902	118,550.59	Ex. 40, p. 7.
1903	175,000.00	" " p. 8.
1904.	400,000.00	Mun. Rep. 1904-5, p. 529; Ex. 58, p. 17.

The balances in the Depreciation Reserves, Dec. 31, 1904, Ex. 40, Sheet 5, were:

Gas	\$667,873.73
Electric	150,836.52
Total	<u>\$818,710.25</u>

On December 31, 1905, the combined balances in the gas and electric reserves were closed into surplus account and at that time aggregated \$378,894.69, as shown in Exhibit 32; indicating that during 1905, plant accounts to the amount of \$439,615.56 had been written off and charged to Depreciation Reserves; such a large amount probably included the writing off of part of the abandoned property at the various plants.

During this period from 1902 to 1906 an "Insurance, Fire, Accident and Contingent Fund" had been set up, which at December 31, 1905 had a credit balance in the Gas Department of \$142,200.20.

This credit balance was carried forward on the books of 1282 the Company until January 1, 1910, when it was closed into "Surplus" account; this amount of \$142,200.00 is entirely independent of the amounts set up for Fire and Casualty Insurance during the period from 1908-1911.

As to the Depreciation Reserves set up in 1908, and closed out to "Surplus" in November, 1911, the credit balances at the time of closing the accounts were:

Gas	\$2,116,433.95
Electric	1,860,140.48
Total	<u>\$3,976,574.43</u>

The other day in referring to these figures I did not have the exact figures, so I have looked them up since.

Q. From your inspection of Mr. Bridges' depreciation study did you find whether or not he had made any allowance in that study for these credits to the various accounts, or whether he had merely taken the total depreciation charges for those years and specified that they should be amortized over a ten-year period without reference to the reserves which were actually set up?

Mr. Bosley: I don't think the question is quite clear. I did not understand the period of time to which it referred.

Mr. Searls: From 1906 to 1916.

A. I have not gone through Mr. Bridges' Exhibit in detail with that idea in view. My impression was this: That in estimating a proper amount that should be provided for depreciation both functional and physical and contingencies that they had used 1283 as a basis, and also which would have to be written off in subsequent years, a period of 10 years in one instance, a basis had been used of summing up certain properties, which had either obsolesced or were abandoned for various reasons, or destroyed in the fire. This information was directed to the fact that part of those properties so listed in Exhibit 58 were probably written off prior to 1906, and that in any event there was a large provision made for writing them off in the depreciation fund. Secondly: As far as losses due to earthquake, fire, and so on, there was a fund on the books which had been created and accumulated prior to 1906 and was still carried on the books subsequent to 1906, amounting to \$142,000; if the net losses due to such contingencies were to be considered I should think that the \$142,000 should be taken into consideration. As I say, I have not checked all of his figures so as to see whether any consideration was given to these balances, or not.

Mr. L. P. LOWE, a witness called for the defendants, gave the testimony, with respect to the subject of depreciation attributable to obsolescence, which is reported in this statement on pages 403-473.

NOTE.—For the Master's discussion of depreciation, see pages 33 to 80 of his report.

1284

SUBDIVISION V.

Evidence Relating to Reasonable Rate of Return.

Mr. F. L. LIPMAN, a witness called for the plaintiff, testified in substance, as follows:

My name is F. L. Lipman. I am 51 years of age and reside in Berkeley, California. I am now, and for the past 11 years have been, the vice-president of the Wells-Fargo Nevada National Bank of San Francisco and have been with that bank for over thirty-four years. The assets of that bank are from \$65,000,000 to \$75,000,000 which must be employed, and which are fluctuating from time to time, so that we are required to keep in close touch with the money market. Our clientele consists to some extent of persons who have money to invest and who come to us for a discussion of opportunities for investment.

My business as a banker requires me to pass upon investments in stocks and bonds and the making of loans upon them, both for the bank and for its clients. During my experience as a banker I have

studied the general subject of the various rates of return that may be realized upon different classes of investment. I have prepared a statement setting forth my opinion upon the different interest rates prevailing and the rate of return on different classes of investment with special reference to public utility investments. I prepared this statement several months ago and the rates and figures contained therein, which are purely for illustration, are those that obtained at that time. Conditions fluctuate daily, but the figures given are as of March, 1917. I feel that the conclusions drawn would apply to any date.

Interest Rates in Relation to the Cost of Capital for Public Utilities.

1. It is often assumed that at any given time and place there is some rate of interest, which applicable to various transactions as they present themselves, is the current rate. This is far from the fact; the current rate of interest is not one but many. For example, in San Francisco today the rate current:

For Bankers' balances, payable on demand, is.....	2%
For balances subject to notice.....	2½ to 3%
For commercial paper.....	4%
For State of California bonds.....	3.80%
For Savings Banks Deposits.....	4%
For Bank Loans on time.....	4½%
For gilt edge railroad bonds, about.....	4¼%
For California county bonds.....	4 to 4.15%
For City bonds.....	4.15 to 4.25%
For high grade corporation bonds.....	4½ to 5¼%
For bank commercial loans.....	5 to 6%
For mortgage loans on country property.....	6 to 7%
For return on capital invested in the stock of established corporate enterprises, a great variety of	
1286 rates, say from.....	4 to 10%
But generally running at from.....	6 to 8%

The cases of higher or lower rates being susceptible of special explanation.

All these rates are completely, and in all respects thoroughly, normal in their respective field, the influence of rates in one field over those in another being comparatively small and negligible. (But basic changes in general conditions may affect all the rates, upwards or downwards, without, however, greatly altering their inter-relations. Thus under the influence of these general causes, the course of rates just now happens to be low,—low as compared with the average of other years.)

The fact is, there are many money markets in any one place, at any point of time, each having its own supply and demand. The business man investing for profit would not be satisfied with the return on sound bonds, although alone this class of investment may be the proper outlet for the funds of widows, orphans and estates.

The country bank balances earning 2% cannot properly be used for the purchase of corporation stocks earning 8%, while the corporations, on their part, are unable to attract investment funds at 2%.

The main reason for these differences in rate is risk. The greater the security, the lower the rate, is a commonplace, but there are many risks other than that of eventual loss. Indeed, safety
1287 would be a prime requisite in all the investments for which a market rate exists, whether 2%, or 8%, or any place between, all quotations being for investments considered safe each in its class. There is no market rate quotation for unsafe investments.

The risks more commonly affecting market quotations, and indeed producing the classification of these quotations, are: risks of delay, risks of uncertainty, risks of inconvertibility.

(a) The risk of delay is instanced in the case of mortgage loans. The bank, or individual investing his money therein puts it practically beyond his control. He can get his money back usually when the mortgagor is ready to pay. Hence a higher rate. Another instance of this risk is the securities of those corporations which require a period of time, perhaps indefinite, before reaching the point where they can operate with profit. The Federal Reserve Banks are an illustration of this. They are undoubtedly bound to attain the position where they can earn the 6% dividend allowed by law but they did not do so in their first year, and no one knew how soon they would. If their stock were bought and sold in the market, this delay in reaching the point of profit would be reflected in the price and therefore in the rate yielded.

(b) The risks of uncertainty are various. They are often the risks which constitute the reason for a difference in income return between the bonds and the stocks of the same corporation.
1288 So also with the uncertainty of the security of a public utility, where, even if the company has shown satisfactory results in the past, its conditions of operating are largely under public control, and to that extent, out of the hands of its owners. This risk of uncertainty will cause the investor to demand a higher rate of return. The character of the company's assets will sometimes affect this question. If they consist largely of salable commodities, such as staple merchandise, for instance, the company could dispose of such assets and so release the capital invested with the result of paying back the investor in case conditions should become unfavorable for the continued profit of the company, and thus the risk would be minimized. So also with assets consisting of valuable real estate, which could be relied upon, if necessary, as an alternative to successful operation. But obviously such real estate must be such as would have an alternative use and therefore an alternative market. Evidently, coal bearing land of a coal mining company could not be relied upon if the coal industry should, for any reason, become unprofitable; and, similarly, the water bearing lands of a

water company (where such lands were required for the community's water supply) could not be devoted to any lower use or be marketed for such use if, through public control or other conditions, the water enterprise itself should cease to pay adequate 1289 returns upon the capital invested.

(c) The risk of inconvertibility affects the cost of capital perhaps more directly than any other influence, because, compared with other risks, a greater number of degrees of convertibility is admissible in the investment market and therefore convertibility is more often evaluated and thus reflected in the rate. In the market quotations enumerated the chief distinction between the rates is based upon distinctions of convertibility. Of these, the bankers' balances bearing 2% are ideally liquid. The owner of the balances can draw them at will, so that they are almost as readily accessible as though already in his own possession. They therefore bear 2% interest and would often go to a lower figure were it not that this rate has become conventionalized. The bankers' balances subject to notice, however, will bear $2\frac{1}{2}\%$ to 3%, a higher rate because the notice required makes them slightly less convertible.

Similarly we find commercial paper yielding 4%, prime railroad bonds $4\frac{1}{4}\%$, corporation bonds $4\frac{1}{2}\%$ to $5\frac{1}{4}\%$, differences due chiefly to the measure of convertibility. The bonds, as a rule, are readily salable in the market, but market conditions might exist wherein they could not be disposed of except at a sacrifice. On the other hand, commercial paper is certain of repayment at an early 1290 maturity and in the meantime is rediscountable through the Federal Reserve system; it therefore becomes the most highly convertible item in this group and returns the lowest rate of interest. The comparison could be extended through the various categories of investment.

We sum up under this head that any time and place there are a variety of rates current for loans and investments; that these rates vary materially, the difference being fundamentally due to differences in risks; risks of loss, risks of delay, risks of uncertainty, and risks of inconvertibility.

2. Aside from the special conditions which determine these several rates of interest there are certain general influences which, through periods of time, affect interest rates as a whole. During the panic of 1893 and that of 1907 and also after war broke out in Europe in 1914, there was a condition of severe stringency affecting interest rates in all classes. Some rates, however, were affected more than others. Commercial paper, now about 4%, was, in 1914, quoted at from 7% to 10%. State and other gilt edge bonds, now 3.80% to say $4\frac{1}{2}\%$ were difficult of sale at 5% or even 6% and upwards. Loans on mortgages were practically unobtainable at any rate and fresh capital for new enterprises was absolutely unobtainable. The full effect of those conditions was felt for a comparatively short time, say two to four months, but their influence lasted much longer, being

a considerable factor in the investment situation for a pro-
 1291 tracted period. Indeed, since such periods of stringency are likely to come again and may recur suddenly without much warning, their possibility becomes an ever present factor in the money markets. While these crises are in progress the demand for money is insatiable, it being then practically impossible for any one to dispose of his investments or otherwise to obtain any use of the funds locked up therein. These considerations must have a strong influence on the mind of the intelligent investor even during times when the money market chances to be easy. During periods of stringency we might infer that new enterprises would never be able to obtain capital on any terms but, obviously, such situations are only occasional and in a sense, abnormal. But as it is, so to speak, normal for these abnormal periods to recur, this fact must be taken into account by the investor whose attitude cannot be based solely upon the conditions of an easy money market. The fact stands out that the interest rate required to attract the investor must be sufficient at least to meet the average situation.

Furthermore, through longer periods of time there are fluctuations of the interest rate still more fundamental. From 1894 to 1897 rates had become very low and they remained low. Many people then inferred that rates were tending downward through the force of some economic law, perhaps towards the vanishing point. The great life insurance companies, for instance, felt it necessary at that time to lower the basis of their actuarial calculations. But
 1292 beginning in 1897, interest rates ran in the other direction, making steady increases which soon upset the fine theories of the nineties. This upward movement continued for nearly ten years, culminating in the panic of 1907, from which time investment capital remained scarce and the rates high until the opening of the European war. Thus, this high level was maintained from about 1905 to 1914. Since the war began business conditions have been so upset that it is quite impossible to distinguish between what is normal and what is exceptional. Looking forward from the present, there is the widest disparity in the views of experts as to the course of interest rates in the immediate future, although it is generally believed that, in the long run the enormous destruction of capital through war will tend to force rates upward, under the well established laws of supply and demand. Be this as it may, the point we are emphasizing here is the fluctuation of rates through periods of time, and that these fluctuations are of importance sufficient to affect the mind and the policy of the intelligent investor.

While on this subject of the changes occurring in interest conditions through periods of time we may mention the conflagration in San Francisco and the profound influence it had on all rates in this part of the United States. Prior to that catastrophe San Francisco
 1293 was so largely the owner of investment capital that it financed practically all its own undertakings at rates more favorable than could have been obtained elsewhere, and had surplus to lend all up and down the Coast. Our financial institutions were accustomed to invest largely in mortgages in Los Angeles, Portland,

Puget Sound and Spokane. The conflagration with its loss of several hundred million dollars in excess of the insurance recovery, changed all that, however. Since 1906 the diminished capital in San Francisco has furnished no surplus for permanent investment or real estate mortgage in other Coast cities; there has not been even enough for our own use, our property owners and corporations having, to a considerable extent, been obliged to look to Eastern sources for loans, at higher rates of interest. Naturally this condition here tends, and will tend, to be modified as new capital accumulates.

3. We all know that the rates vary from place to place. Money in New York may be worth 3%, in London 5%, in the Argentine 8%, and in the Strait Settlements 10%, all on the same day. Similarly, a considerable disparity may exist in rates between those current in New York, Denver, Dallas, Seattle and San Francisco or Oakland. A newer, or less settled country has a smaller fund of saved capital and a greater relative need for development through fixed improvements and the like. We have called upon European
1294 capital to build up the United States and our progress would manifestly have been restricted if this country had had to depend upon its own locally saved capital. In the United States, the West has called upon the East. We are confronted by the question, what is to be the influence on the industries of this country of the unprecedented destruction of capital in Europe through war. Europe will not be able to continue supplying capital to the new world; on the contrary, it will be in the market for our capital and will be inclined to bid a price sufficiently high to obtain it. This European demand for American capital will be effective chiefly in the older settled parts of the United States where saved capital is relatively abundant. This demand at high rates on capital in the Eastern part of the United States will deflect the capital to a certain extent from use in other parts of the United States, including use in California. The reduction thus resulting in the supply of capital for our industries will have a material effect upon our own money market, tending to disarrange the relation between supply and demand, to hold back some of the improvements for lack of capital, and to make our enterprises pay more highly for their money. We have seen this influence at work heretofore. From 1907 to 1914,
1295 capital for permanent investment had frequently been so scarce in New York and in the other Eastern markets, that our California corporations have had to bid very high rates to obtain supplies for use here, instances being known where the cost was upwards of 10%. The emphasis here is upon the disparity between rates existing in different places, especially between an old established community and a new one, and the influence the rates of one place may exert upon those at another.

4. We may now consider what is required on the part of a business enterprise to obtain capital funds, from the viewpoint of the money markets.

Here I will digress to emphasize the fact that this investigation of rates is from the viewpoint of the investor. It is not directly

concerned with any theory of what a company could afford to pay for capital, nor with what the use of such capital under various conditions might cost a company. It is intended as a discussion of the question, What rates or terms will induce the investor, having the other opportunities offered in the markets, to furnish his capital for the use of a business enterprise?

All the factors already mentioned will naturally have their influence. The investor can put his money into State bonds at 3.80%; he can deposit it in the Savings Bank at 4%; he can buy other public securities at about $4\frac{1}{4}\%$; or invest in standard corporate bonds at $4\frac{1}{2}$ to $5\frac{1}{4}\%$. If he is in a position to take a certain amount of speculative chance, he can buy corporation stocks 1296 returning him, say 6% to 8%. What rate then must be offered him by a new enterprise in order to attract his funds. He will bear in mind that the new enterprise involves a higher degree of uncertainty, a condition commonly met by an opportunity perhaps for speculative profits in case of marked success. In any community, old enough to have accumulated a considerable mass of saved capital, a certain part of that capital will be so owned as to be interested in the speculative outlook of a new enterprise, and it is from that source that the promoters of the enterprise must look for their capital funds. The question, What rate of Interest will attract capital for a new enterprise, therefore involves the fallacious assumption that it is some rate of interest, that is, some normal or usual rate, which attracts capital for such an enterprise. In fact it is not a rate of interest, but an opportunity for a speculative profit, and this must be so, for the new undertaking will inherently be subject to chances of loss, or non-success, and the possible risk can be offset only by the consideration of a possible profit. In the case of the utilities, it is sought to place them where they can obtain capital on the basis of some rate of interest; the idea being apparently that public inspection and regulation, while eliminating opportunities of profit, will sufficiently stabilize the new industry so as to 1297 make it promise a reliable return resembling that of an established enterprise. Whether this can be accomplished may depend upon the particular circumstances of each case, but it would seem doubtful if new enterprises or new extensions could ever be divested of the risk of failure, partial or complete. Now the largest source of investment funds is estates, widows, orphans, trustees, and similar holders of accumulated funds, and these, being impressed with the character of trust funds, necessarily seek investments which are altogether safe, sound, seasoned and marketable. Such funds can be satisfied only with the best of bonds, mortgages, and the like. They are not at all available, and should not be, for capital issues of a new enterprise. For this latter purpose the funds properly to be sought are surplus amounts in the hands of owners, living men, who, with other means and personal earning capacity, feel that they can afford to take the risk of investing in a new enterprise. And such supplies are comparatively restricted. Men of this class are usually competent and shrewd, able to weigh with some intelligence the prospects and risks. I am trying to say that it is these relatively

competent men from whom capital must be sought for new enterprises. It must be admitted that formerly a considerable part of the capital for such purposes was derived from the widows and orphans, the small saver, and similar people of restricted business experience. This was accomplished through the persuasive salesmanship of promoters and others, who, having perhaps some underlying faith in the outcome of the enterprise were nevertheless governed by an imperfect sense of responsibility in connection with the solicitation of savings and trust funds, the owners and guardians of which ought properly to have been considered exempt from being tempted to speculate, or from having the speculative side of the investment glossed over. These should rather have profited by sound advice to confine the use of their funds to investments fully seasoned and sound. But recent history has done much to teach the uninstructed public something of the hazards that they have no right to assume. Here, in California, the experience of the Northern Electric, the Natomas, the General Petroleum, and other enterprises which were aiming after objects economically worthy and sound per se has brought home to the public a realization of the inherent hazards of a new enterprise, much the same as the experience of the California Safe Deposit and Trust Company has warned the public against banks offering too high a rate of interest. For the present, therefore, the reservoirs of capital to be tapped for a new enterprise are confined substantially to the classes of funds which are economically justified in assuming the hazards of new enterprises, namely, the surplus funds of the well-to-do, of the active, successful, business man.

The point to be emphasized here is that this kind of investor is relatively competent and will tend to be accurate in judgment as to what risks he can afford to take and what inducements of profit should be sufficient to attract his funds. This inducement will consist in an opportunity of profit exceeding the normal interest rate on sound investment. In other words, the inducement must be made up of two factors; the ordinary interest rate plus a profit or additional rate.

Now going back to the list of current rates, we find that established enterprises offering themselves to the business man for his investment range from about 4% for liquid funds, practically callable under all ordinary conditions of the money market, to corporation bonds returning the investor up to 5% and also reasonably convertible through the bond market, to the capital stock of an established corporate enterprise returning say from 6% to 8%.

Those are Eastern railroad stocks that are open to people in this market the same as the others. It is evident that it is this last named class which will compete most closely for the investment funds of the business man, and so it might be worth while to see what are the actual rates obtainable.

California Packing Corporation 7% Preferred Stock returns about 6.4% on the market price.

The Associated Oil Company is paying just under 6% on 1300 the market price but, in common with other oil stocks, is understood to furnish certain speculative opportunities of profit.

The sugar stocks are paying from 6% to 16.55% as follows:

Hawaiian Com'l & Sugar Co.....	6.21%
Oahu Sugar Co.....	8.03
Olaa Sugar Co.....	8.57
Onomea Sugar Co.....	9.01
Hawaiian Sugar Co.....	9.73
Hutchinson Sugar Plantation.....	13.15
Pioneer Mill Co.....	13.33
Paaubau Sugar Plantation.....	15.65
Kilauea Sugar Plantation.....	15.79
Union Sugar Co.....	16.55

San Francisco Bank Stocks are paying from 5% to 6%, but these are held largely by groups of capitalists who are closely acquainted with the institutions and their management, and who regard such investments as stable and safe.

Baltimore & Ohio Railroad yields.....	6.29% on the investment.
Great Northern Preferred.....	6.10
Northern Pacific.....	6.63
Pennsylvania Railroad.....	5.54
American Can Co. Preferred.....	6.63
American Sugar Refining Co.....	6.29
American Tobacco Co.....	9.21
Chino Copper Co.....	10.43
1301 National Biscuit Co.....	6.03
United States Rubber Co. 1st Pfd.	7.40

These various lines of business have each their particular opportunities and hazards. They are all dependent, as one factor, and more or less largely, upon continued good management, a consideration on which the business man can form some sort of a judgment. Speaking generally they exist under the conditions of ordinary business competition and development through which, and in spite of which, they have reached their dividend earning position, a position of tested soundness and apparent permanence. It seems clear that with such opportunities of investment open, no new enterprise could expect to obtain funds unless it offered some inducement beyond such rates. How much more than 6% would have to be offered would naturally depend upon the circumstances, but it is safe to say that the rate would have to be at least 7%, and in many cases more. These theoretical considerations are enforced by practical observation and experience. Business men come to their banker, from time to time, to discuss these questions and I can testify that I have found this to be in fact their attitude.

Take the case of a new utility required to raise \$10,000,000. capital for the expenditures on its plant and business equipment. Nat-

urally, it would seek to raise a certain part of this capital on first mortgage bonds. If it could earn 7% on this \$10,000,000 capital it would have net earnings of \$700,000. per annum.

If such earnings could be safely counted upon it might raise \$6,000,000 of its capital on 5½% bonds, the remaining \$4,000,000 on capital stock to which it could offer the expectation of dividends at 7%.

The bond interest on \$6,000,000. at 5½% would consume \$330,000
The dividends on stock \$4,000,000 at 7% would require 280,000

Total	610,000
Out of this income of.....	700,000
Leaving a surplus of.....	90,000

indispensably necessary for eventualities, unforeseen expenditures, etc., and to equalize dividends during periods of lean business. The point of this illustration is not that it is precisely the *modus operandi* of raising capital for such an enterprise but that we can take it as an example of the minimum returns that would have to be offered, and reasonably expected, in order to induce the investment of capital. But as a matter of fact the 7% earnings must be, more or less, conjectural. Even if we assume that theories of rate regulation would today permit the 7% earnings, there is no certainty, from the investor's point of view, that some later rate-fixing body might not

have a different notion and reduce those returns so as to cut down the income. Furthermore, there is no guaranty on the part of the State that the corporation as an economic enterprise can sell its commodities and services so as to earn the 7%. History has many instances of the bankruptcy and reorganization of properties whose returns were thus overestimated, and the hardheaded business man would have to be pretty thoroughly convinced that the corporation could and would do as well as the estimates before parting with his money for a 7% return.

5. The rates required to induce capital to invest in the cost of new extensions of established enterprises, although differing apparently in some respects from the brand new enterprise, it seems to me must be judged on the same general principles. If the enterprise, through regulation or otherwise, has been unable to accumulate any substantial surplus, new capital for extensions is in much the same position as original capital would be, with perhaps the advantage of some additional data on which to forecast the probable profitableness of the new extensions. If, on the other hand, this established enterprise has accumulated surplus which tends to safeguard the returns on the additional capital regardless more or less of the profitableness of the new extensions, it is possible to conceive of such risk being partly or wholly eliminated. But then the question economically considered would not be exactly that of calling for new capital but of liquefying or transforming old capital left in the business. If in future, maximum rates and other conditions of operating our utilities are to be fixed by the

public at the lowest point possible, the instances will become fewer and fewer where companies can accumulate any substantial surplus. Indeed, I suppose that where such instances exist today they are mostly those of companies dating from former years back into a time when capital invested in public utilities was allowed to make a profit commensurate with that of other enterprises; where the risks—initial and other—were compensated by opportunities of profit and where past managements prudently left accruing surpluses in the business to strengthen it in future years and to insure its progress.

I conclude therefore by expressing the opinion that even under the most favorable conditions, in order to attract capital for its needs, a public utility operating or to operate in this vicinity must be allowed at least seven percent and on the full capital required; but I must add, from the viewpoint of the money markets that I am by no means sure that 7% would be sufficient for this purpose.

The opinions which I have expressed are applicable to the period from July 1, 1913, to June 30, 1916.

1305 Cross-examination:

The Pacific Gas and Electric Company has an account with the Wells-Fargo Nevada National Bank.

The statement that I have just read was prepared by me at the request of counsel for the Spring Valley Water Company and was first used in connection with that company's rate case.

All the large banks have dealings with the public utilities in San Francisco. During the time that I have been associated with the Wells-Fargo Nevada National Bank I have been more or less associated both in business and in social affairs with the men connected with the public utilities. In all the conversations I have had with these men on the subject of rates they have said that they were seeking to find what was a fair rate. I have no reason to suppose that they are seeking for anything other than a fair rate. A bank does not charge a customer all the traffic will bear. It aims to charge a fair rate, and there is the same disposition among every good business man in good standing. The conversations that have taken place have generally been in the form of these men questioning me of what I thought was a fair rate and that is what I have tried to answer in this testimony.

1306 The omission from my statement of a list of rates at which money could be obtained on mortgage loans on city property was unintentional. The rate in March, 1917, was from $5\frac{1}{2}$ to 6 percent.

Mr. Searls:

Q. Did you attempt to make any particular study of the question of a fair rate of return to the Pacific Gas and Electric Company in particular, or is your study based entirely upon general considerations of the rate which public utility corporations would have to pay?

A. The latter. My point of view is what will be required to

provide the money for investment out of the pockets of those who have it. That is the point on which I have had experience and where I have been able to observe it. I have no theoretical views aside from that on the subject. In other words, I feel, as if I know that below a certain rate public utilities cannot get the money. Now what they ought to get I don't know. I am not attempting to testify on that.

Q. Your testimony goes then solely to what you consider to be the fair average cost of money over a given period to the company and not being paid by any particular company?

A. By inference, yes. During this period under discussion utilities in my judgment would not be able to get capital except at these rates.

Q. Now in your hypothesis in which you stated the manner 1307 in which a company starting out with a new enterprise might finance itself, you premised it, I believe, with \$3,000,000 of bonds at $5\frac{1}{2}$ per cent. and \$4,000,000 of 7 per cent. stock?

A. Yes.

Q. In your testimony in the last case which covered the same period you used 5 per cent. bonds. What was your reason for changing the rate to $5\frac{1}{2}$ per cent?

A. Because I have gone over all those figures and I have reached the conclusion that they were wrong, that the money could not be had on 5 per cent. bonds, so that it would cost 5 per cent; that the bonds might read 5 per cent. or 6 per cent or $5\frac{1}{2}$ per cent. or any other rate, but they could not be sold so as to cost the company less than $5\frac{1}{2}$ per cent. I corrected that because I thought it was more correct.

Q. Some of the utilities issue bonds at less than $5\frac{1}{2}$?

A. The nominal rate is less.

Q. If that was the case, those bonds might not cost the company as much as $5\frac{1}{2}$ per cent?

A. But the case that I am suggesting is a new company. I don't know where any new company has got any money at less than $5\frac{1}{2}$ per cent.

1308 Q. Is your testimony then to be taken as an estimate of the cost of money to a new company as distinguished from the cost of money to a company already in the business requiring new capital?

A. I made that distinction in my testimony. I have referred to the cost of new capital, and then in the last part of my testimony I have tried to consider under the same principle the cost of new money to an old company.

Q. And you came to the conclusion that the cost of money would be the same in either event?

A. No, I did not. I have stated here: "The rates required to induce capital to invest in the cost of new extensions of established enterprises"—That is the cost of the old company—"although differing apparently in some respects from the brand new enterprise, it seems to me must be judged on the same general principle. If the enterprise, through regulation or otherwise, has been unable to

accumulate any substantial surplus, new capital for extensions is in much the same position as original capital would be, with perhaps the advantage of some additional data on which to forecast the probable profitableness of the new extensions;" and so on. I won't take the time to read it.

Q. Then generally speaking you conclude that the cost of new capital to an established business would be the same as the cost to a new business: Is that true?

A. If the old established business has no surplus on hand to safeguard the new application of capital, yes. If it has surplus on
1309 hand which will safeguard the new application of capital that would be a modifying circumstance to be considered with the particular circumstances of each case.

Q. If the company did not have a surplus on hand that might either be the result of bad fortune on its part or mismanagement, might it not?

A. Yes, and perhaps of other things that we do not think of; it might be.

Q. If you were to take your \$6,000,000 at 5½ per cent bonds which would require a return of \$330,000 annually, and your \$4,000,000 of 7 per cent stock which would require a return of \$280,000 annually, you would have to earn a total return in order to pay the interest on that investment of \$610,000, would you not?

A. Yes.

Q. What return on the total investment of \$10,000,000 would that average?

A. That would average 6-1/10th per cent, as a matter of course, but you would have to earn more than \$610,000 to safeguard the payment of the \$610,000 in dividends and interest. I could not advise a client that came proposing to invest in a 7 per cent stock or 5½ per cent bond of an enterprise, if he showed me that the total earnings of the enterprise were just enough to pay that, to invest in it.

Q. Suppose the bonds only yielded 5 per cent on their face. Wouldn't it be a maxim of the ordinary cost of investment that the earnings should be 1½ times the bond interest?

A. I could not answer that; I don't know.

Q. Do you know of any such principle that is recognized?
1310 A. I do not.

Q. If the company already had a surplus and was asking for \$10,000,000 of new capital it might not be necessary for it to reckon on earning the additional \$90,000 in order to be safe in making these payments of interest on bonds and stocks?

A. If the company had surplus earnings already which would answer the purpose of paying the interest and dividends on the new \$10,000,000 of capital, naturally it would not need to get it out of the new extensions, or whatever it might be that the \$10,000,000 was to be used for.

Q. I do not think that you understood my question. I was solely referring to the question of safeguarding the investment. I am assuming that its earnings would have to be enough to pay the

interest on the bonds and the interest on the stock of the new investment, and if the company already had a surplus, it would not be necessary to further safeguard that by increasing the earnings by the \$90,000 to which you referred?

A. If the company already had sufficient surplus to act, on that same basis, yes. In other words, if the company had \$90,000 or \$100,000 or \$500,000 or \$1,000,000 of surplus income, that would provide a surplus which would safeguard the income on the new investment. The point that I am making is this, that the investor will require that the amount which it has contracted to pay shall not only be earned by the company but there shall be some surplus
1311 plus which shall safeguard the company in continuing to carry out its contract of paying that interest.

Q. If you had a utility or an enterprise that was seeking \$10,000,000 of new capital, where it had an investment of we will say, as much as one hundred million dollars, you would expect to find a surplus designed for just that purpose, would you not, if it had been conservatively managed in the past?

A. I should not expect a concern that has as much as one hundred million dollars of capital to have the temerity to borrow ten millions of new capital if it was not safeguarded; and I should suppose that the management would safeguard it either by having the right to count on returns which would pay the interest on the new application of capital or by having a surplus of some kind which would meet that condition; I should say that if it was not in that situation it could not get \$10,000,000 of new capital.

Q. Let us take it from the standpoint of the investor who approaches the market with an inquiring eye and finds this offer of ten million of capital, and that it is proposed to increase the earnings by \$610,000 to pay the 5½ per cent interest on the bonds and 7 per cent on the stock; and he finds also that the company has been conservatively managed in the past and has a liberal surplus on hand, do you think that he would hesitate in investing his money at this price because he did not find any additional \$90,000, set aside for
this new enterprise?

1312 A. Assuming that the amount of surplus is adequate in his judgment my answer to that question is no, I don't think he would hesitate; I don't think he would require specifically that the new application should earn its own surplus or any margin; what he would expect would be that the margin would be there to safeguard his investment.

Q. In order to be adequate could you hazard any estimate as to what the surplus of the hundred million dollar corporation ought to be?

A. None whatever.

Q. A substantial sum?

A. I suppose it would be quite a large sum.

The Master: Mr. Lipman has been talking of surplus income. Of course surplus capital would presume that there was previous surplus income.

Mr. Searls:

Q. I do not think we are at variance on that. I understand by surplus the amount which is ordinarily shown by the corporation in its balance sheet as being the surplus over and above the amount which is necessary to declare its annual dividends and to pay its bonded interest. Is that your understanding?

A. That is one expression of surplus shown on the balance sheet, or supposed to be one expression of it, but what I have reference to is the actual surplus of earnings which presumably would imply a surplus of capital. Now, I am speaking of the fact rather than what the balance sheet would show. I have seen balance sheets that

showed a surplus where I would not advise an investor to
1313 consider that surplus as a safeguard for his new investment.

But if I understand the question correctly, I do not make a distinction between a real surplus of capital and a real surplus of income, because as his Honor says the one will necessarily presuppose the other.

Q. In other words there is a surplus of capital if there has been a surplus income during the years previously, probably more in one year and less in another, but there must have been some fairly regular showing for a surplus income?

A. I would rather bring it down to the present time. I say if this hundred million dollar corporation has an annual requirement of \$7,000,000 to pay its interest, we will say, and it has an annual net income of we will say, \$8,000,000, that there would be a surplus income of a million dollars. Now that surplus income would imply to my mind surplus capital; whatever the balance sheet showed, it would imply that surplus capital.

Q. Now then, what effect on the mind of the investor would the proportion of stocks and bonds issued have? Within what limits would he be disposed or undisposed to invest his money at the rates of interest that you have suggested?

A. I think I can only answer that in general terms. The investor would expect that the bond issue would be small enough so that under any foreseeable circumstance the company's property would be sufficient to meet the contract in the bond, including
1314 the eventual payment of capital and the payment of interest in the meantime.

Q. Can you specify that as being a given percentage of the company's total capital, such as $\frac{2}{3}$ or $\frac{3}{4}$, or any particular amount?

A. No. We are speaking from the investing point of view. The investor would not expect to be an expert on that; he would simply expect that there would be such a margin of earnings over the bond issues, if he were investing in bonds, as to apparently make his investment of bonds safeguarded. Now if he was an investor in stock, similarly, the smaller the number of bonds ahead of him the better would he regard his stock investment; so an investor in stock or bonds, either one, would feel that he was safe-guarded more by a relatively smaller rather than by a relatively larger amount of bonds in proportion to the stock. That is only in general terms.

Q. Would there not be a point at which he would see the total mortgages on the property to clearly approach its total capitalized value. For instance, if a corporation had out mortgage bonds of 90 per cent of its value, it would have to stop somewhere short of that in its bond issues, would it not?

A. I should say it would.

Q. Can you give us an idea of the maximum limit at which its stock sales would be seriously affected by the amount of its outstanding bonds?

A. The stock sales might be affected or the bond sales might be affected; the bondholder and stockholder is much in the same position; if the company owes too much in the form of bonded indebtedness. I do not think that I am prepared to testify to any proportion on that. We people who are connected with the investment side of the money market, if there seems to be any question in our minds, resolve it on the side of safety. It is the business of the corporation financiers to see that their stocks and bonds are kept to a point where the public is going to purchase them. The minute the question is asked, if it does not owe too much in bonds, the purchaser stays out. In other words if it is mortgaged too deeply and you raise that question, the investor is very likely to solve the problem for himself by staying out of it, not putting his capital in. But I cannot give you that limit.

Q. You have represented a great many industries undoubtedly; would you say that a company that had 75 per cent of its capital in bonds and 25 per cent in stocks was too heavily loaded?

A. I think that would have to depend on the circumstances of the case. I do not really feel competent to answer that question in general terms, I really don't know.

Q. You could conceive of circumstances where 75% would not be an unduly high percentage of bonds?

A. I should say so—I could conceive of such circumstances, yes.

Q. Can you give me an idea of the circumstances which would warrant such a heavy bond issue?

A. Well, I can conceive that the value, the character of the assets was such that I should feel that a margin of 25% of the whole capital, or 33 $\frac{1}{3}$ % of the amount of the mortgage was adequate.

I do not know that I am prepared to say what would be the particular instance such as that. We judge of those things according to the general circumstances. I do not want to be incoherent about it, but we do not approach this thing from the standpoint of a corporation financier, but rather from the standpoint of whether we will put our money into it or not; if we did not feel perfectly satisfied with the investment we would stay out of it; if the bonds are not safeguarded, as we believe, by the margin of their capital, we prefer to put our money into something else.

Q. Now, I think you told me in the Spring Valley case, on cross-examination, that the securities of public utility corporations are largely affected by the inconvertibility of the property; in other words, that public utility property, having been devoted to public

use, cannot be readily diverted from that use, and has no market value for other purposes, and the question of its earning power would be a deterrent in the minds of the investor: Is that a fair statement of your testimony?

A. It is in my direct testimony. I said that, yes.

Q. Then, in making up your statement here of stocks and bonds, your \$10,000,000 investment as between stocks and bonds, you must have had some more or less definite assumptions in mind, did you not, which would justify that particular apportionment?

A. Yes, I had this, that if the \$10,000,000 was going to be honestly expended as it ought to have been honestly expended, 1317 so that it would have a sound value—that it would carry a mortgage of \$6,000,000, for illustration, rather than \$7,000,000 or \$8,000,000 or \$9,000,000, because I regard it as safe. I could have considered \$5,000,000, but it is not a very good illustration. If you will see, this is done by rule-of-thumb, this division. I say later on, "The point of this illustration is not that it is precisely the modus operandi of raising capital for such an enterprise", but I am only trying to illustrate the point of raising capital for such an enterprise, part of it on bonds and part of it on stock, and how that would work out in such a case. Now, how far this corporation, this supposed case—we do not even say what kind of a business it is in—how far it may go in putting out a larger amount in a bonded debt, I could not say; I do not know.

Q. A few moments ago you said to me that there could be circumstances under which as high as 75% bond issue might be justified, or at least I so understood you to say.

A. I said I could conceive of such case.

Q. Now, if you happened to conceive of those particular circumstances in this case, it would very materially affect the rate of return which your corporation would have to earn in order to get this \$10,000,000 of new capital, would it not?

A. I don't know. Let me see if it would.

Q. If you had \$7,500,000 in 5½% bonds and only \$2,500,000 in 7% stock it would obviously give you on the average less than 1318 6.1% on this scheme?

A. The difference between the two figures would be 1½% on a million and a half, that is \$22,500. Now, considering this purely as an illustration, it does not regard anything, it is just imaginary, in order to bring out a point, it does not seem to me that is a very material difference.

Mr. Bosley: An increase in the amount of bonds would adversely affect the marketability of the stock, would it not, Mr. Lipman?

A. Yes, it would tend to.

Q. It would tend in that direction?

A. Yes.

Q. You might have to pay more than 7% on the stock to induce them to come in if 75% was raised on bonds?

A. Yes.

Q. And the same thing might also affect the interest rate you might have to pay on the bonds?

A. You might sell a $5\frac{1}{2}\%$ bond to the extent of 60% of the value of the property more readily than you could if it affected 75% of the value of the property.

Q. It would be more likely that the rate charged would be 6% if you issued 75% of the value of the property in bonds?

A. It would be more likely you could not sell the bonds at all.

Mr. Searls: I find you would only have to obtain \$587,500 against \$610,000 on that ten millions;—that is not considering the surplus—as against your former assumption; that would make a difference of \$22,500.

A. It comes from the fact that this is a pure assumption—if you go a little bit farther and assume that the whole \$10,000,000
1319 was raised on $5\frac{1}{2}\%$ bonds, you still further reduce it to \$550,000, but you could not sell the bonds.

Q. I am just coming to that. It just depends on how heavy the corporation was bonded, does it not?

A. How heavily it could be bonded; it is not an arrangement arbitrarily made by the financial managers of the corporation; it has got to depend on the money market; it has got to depend on what investors will do.

Q. Supposing that the railroad commission has a limitation of 25% on new capital which has to be invested in stock—isn't that correct, Mr. Bosley? Don't the Commission require you to issue at least 25% of your new capital in stock?

Mr. Bosley: I do not think the Commission has laid down a hard and fast rule, but they have suggested, I believe, in a number of their decisions that 25% at least of the capital ought to be raised by stock issues, rather than by the sale of bonds.

Mr. Searls: Leave that out of the question for a moment and assume that your corporation is bonded not more than 50% of its total capital, a \$100,000,000 corporation, and required, \$10,000,000 new capital, as an economic question solely it might be possible to raise that entire \$10,000,000 by a bond issue, might it not?

A. Yes, assuming that it had enough surplus and its credit was good.

Q. Don't you find it very difficult to pick out a particular
1320 rate of return and say that it will apply generally?

A. Very; I would say that it is impossible to me. I am only testifying as to the minimum rate 7%; I said that I doubted very much whether 7% is sufficient.

Q. If you had a case like that that I have just outlined, where you needed \$10,000,000 of new capital and the company had plenty of surplus and it was not bonded over 50%, you might easily sell bonds at a cost not exceeding $5\frac{1}{2}\%$, might you not?

A. Yes.

Q. In other words, the cost of new money would be $5\frac{1}{2}\%$ instead of 7%?

A. I doubt if that statement would stand in this case as being a correct statement. I try to cover that in my last point here: "If, on the other hand, this established enterprise has accumulated surplus which tends to safeguard the returns on the additional capital, regardless more or less of the profitableness of the new extensions, it

is possible to conceive of such risk being part or wholly eliminated." That is the case we are talking about. "But then the question economically considered would not be exactly that of calling for new capital, but of liquifying or transferring old capital left in the business." In other words, this \$100,000,000 corporation has a certain surplus, that surplus is so much, and produces such surplus earnings that it safeguards the new application of capital. The investor was willing to put in his \$10,000,000 at the bond rate, which we
 1321 will say was $5\frac{1}{2}\%$, whether the company spends that money one way or the other, profitably or not, quite a different situation from the new corporation; but that economically considered is not calling for new capital; that is working on the basis of liquifying the capital which is in the form of surplus in the business, and it is that surplus that is safeguarding the new capital.

Q. The surplus would not be sufficient to take the place of that capital?

A. I do not know. You have not stated the case. A \$100,000,000 corporation could very readily have a surplus sufficient to pay \$10,000,000; it sells \$10,000,000 of bonds, but under circumstances where the financial standing of the corporation is already so good, its earnings are so great, that the investor does not care what becomes of the money, you might say; he does not care whether it turns out to be profitable or not.

Q. But the investors who already had their money in and who were stockholders would be vitally interested.

A. Precisely; it is their capital that is being liquified or turned in; it is their capital that is going into it; the new man is going to be perfectly safe on his bonds; it is the old stockholder that carries it; that is where the risk comes in. It does not come on the new investor, although in form he is a new investor.

Q. The old stockholder, the company has got his money in there.

A. Yes, it is not seeking to attract him to do anything more; it is simply trying to treat him with justice.

1322 Q. Up to the point that he started to kick at the board of directors, he has virtually nothing to say about it.

A. The point, however, is why it was that a company under some circumstances could put out a \$10,000,000 bond issue and sell that bond issue at very low rates. Why should it? It can only do so because the financial strength that is already in that corporation is such as fully to safeguard that new \$10,000,000. That which safeguards that new \$10,000,000 is that which had already been received, not the new \$10,000,000.

Q. That which safeguards the \$10,000,000, to-wit the accumulated surplus, is cumulated as the result of high earnings in the business, and it might well be that the corporation could obtain money more cheaply than it has been obtained, and consequently could afford to accept a lower rate of return.

A. You can make any kind of assumption as to how you get the surplus. It might have been done by high rates; it might have been done by economy; it might have been done by robbing somebody; the point is, as long as it is legal, it has this property.

Q. Does not that bring us to this point, Mr. Lipman, this point of differentiation between the new business, starting without any capital and the old business which has a capital and has been going for a period of years: In the one case you have not any actual situation to deal with, I mean so far as cumulated surplus
1323 and past history and so on, and, conceivably, your capital will cost more, and in the other case if you happen to have this set of circumstances which I have outlined, your capital will cost less than the new business capital would?

A. The new money that goes in in the second case would cost less but it would cost less because it was protected by the money that is already in there; but that is not inherently and necessarily the distinction between the new company and the old; there are plenty of new companies that any one of us would rather put our money in than some old companies that we know of.

Q. Now, if you were testifying with respect to three particular years, to-wit, between June 30, 1913 and June 30, 1916, you would not be concerned particularly with what the company had paid for money in the past, but you would simply take the situation as you found it then and develop it with respect to the market rates of interest for investments of that class during those years?

A. My testimony is as to what you would have to offer the investor to get his money during those years.

Q. And if the investor were offered some such proposition as I have outlined, conceivably the rate which the company would have to pay would be lower than the rate which you have testified?

A. Yes.

The Master: Read that question. (The last question and answer repeated by the reporter). That is not intelligible to me.

1324 Mr. Searls: I have just outlined to the witness a situation where a corporation had an accumulated surplus and had an established business, and the surplus had accumulated as the result of earnings at rates in excess of 7%, we will say, or whatever the normal rate was in the past, and it was able to get money during those three years at a lower rate. That was what you understood by the situation, was it not, Mr. Lipman?

A. That was what I understood, that during that period it would have been possible, under those circumstances, to have gotten money at a lower rate, I should think, yes.

Q. Wouldn't you say, then, it would be practically impossible to apply your rate of 7% to any particular corporation unless you fully understood the circumstances that had attended its financial history in the immediate past, and the consequent result on the price it would have to pay for money during those years in question?

A. My testimony is confined to what the money market would yield, what money could be obtained for in the money market. Now, if it were alleged that that would have to be applied to the case of a particular corporation, with due consideration of the particular facts of the case, that is what I should expect, yes.

Q. Do you consider that the yield of sugar stocks on the market has any particular bearing on the market rates which a public utility would have to pay for its money?

A. Decidedly, yes.

Q. I wish you would develop that.

1325 A. I intended to cover that in this way. I think I can perhaps quote it from memory. "Now, going back to the list of current rates, we find that established enterprises offering themselves to the business man for his investment ranged from about 4% for liquid funds, practically recallable under all ordinary conditions of the money market, to corporation bonds returning the investor up to 5%, and also reasonably convertible through the bond markets, to the capital stock of an established corporate enterprise returning say from 6 to 8%." We discussed at that point whether that would be 7 or 8%. "It is evident that it is this last-named class which will compete most closely for the investment funds of the business man, and so it might be worth while to see what are the actual rates obtainable." These are illustrated by the list of these stocks. The business man may not have any particular interest in sugar, or in some of these railroad stocks, or any of the other stocks whose rates are given here; but he has that open to him, and these companies are companies that are fully organized; they have made their way in business through competition; their position is relatively assured. Now, with those before me, 6 to 8% and higher rates, I have stated that it was my judgment that new money for an untried corporation could not be had at a rate that would be less than 7%.

Q. How about the new money for an established corporation?

A. The new money for an established corporation, I would
1326 like to repeat, in my judgment, it will come under the same heading: Just so far as the established corporation has not saved a surplus and just so far as it has saved a surplus the question is how far that saved surplus will safeguard the money.

Q. Now, let us take the case of these sugar stocks: What influences these stocks on the market yielding a rate as high as 16½%, whereas an established corporation stock is selling on the market at about a 6% basis, we will say, or 6½% or 7%: Is it not because the hazard in the sugar enterprise is so great that the purchaser will not pay enough premium over par on the stock so as to bring that rate down to the 7% basis on which he is willing to buy the corporation stock?

A. Substantially so, and also due to the fact that because a hazard in the business is fluctuation in the business. The sugar crop may be much larger one year than in another year; so in the good years they expect a high rate of return; but that is, as a matter of fact, open to all of us who have funds to invest, and it is a matter of individual judgment whether or not that would be safe for an income in the long run as compared with the opportunity that is afforded by a new corporation, new public utility corporation wanting to get capital for its needs.

Q. You could go a little farther and say you might invest your money in some mining stock or war baby, or something of that sort which would not only yield you a handsome rate of return on
1327 the strength of its dividend record, but might fluctuate, go up in price, and offer you a fine chance there. Now, would

you consider that stocks of that class were particularly in competition with public utility stocks?

A. Not particularly. I will say that the illustration you made shows that the matter can be exaggerated so that it would be absurd.

Q. Does not the same situation apply to the sugar stocks in the light of past history, and the future probability: Isn't the fluctuation so great that it practically takes them out of the same category as public utility stocks which have fairly assured rates, fairly assured a maintained rate of earnings over a period of years, a stable investment behind them?

A. No; I know of a very large class of investors that consider sugar stocks amongst the best and safest investments there are; they are persons of my own acquaintance, persons who live in the Hawaiian Islands, where the industry is right under their eyes, and who know the conditions, who keep a very large proportion of their means invested in sugar stocks because, from their point of view, it is conservative, with people who live there; we think of sugar as dependent on a tariff, on competition, on one thing and another; we see it fluctuate, but these men who know the conditions do not regard it as a hazard anything like the hazard you just cited to me.

Q. Would you say, then, that class of investors would be
1328 limited to those particular men who are very familiar with the sugar industry?

A. Only in the same sense that is true of all of us; every man has a certain acquaintance with particular things and he makes his investment in that article. I should not expect that a public utility in San Francisco would sell much of its securities in Portland, Maine, any more than I would expect that the securities of a public utility in Portland, Maine, would sell in San Francisco. We have a certain market for sugar stock which is largely shared in by people who live in sugar districts. That is a condition we find obtaining throughout, that people tend to confine their investments among the things that, in general, they are familiar with.

Q. Aren't these prices for sugar stocks largely influenced by war conditions to-day?

A. I should judge they are largely influenced by war conditions.

Q. Is the price of public utility money as strongly influenced?

A. I should say probably not so strongly influenced.

Q. During the years in controversy, for instance, we had an approaching election in which there was a question as to whether the Republican party was to be returned to power with the consequent high tariff program, or the Democratic party was to remain in power, with a pledge to free trade. Wouldn't that very materially affect
the selling price of sugar stocks, just that speculative ques-
1329 tion?

A. Yes, and in today's paper we read about the United Railroads; and I think that would affect their securities, too.

Q. However the influences as to which I have just referred will not be so strong in affecting the price of public utility stock, will they?

A. I should say they would not. Just to refresh my memory,

the influences you referred to are the war influences. I should say the war influences would affect any industry depending on a commodity, depending on local circumstances, speaking generally.

Q. And the question of the tariff upon which the sugar industry depends so largely would be a very strong factor also during those particular years, would it not?

A. It is likely to be.

Q. Nobody knew just what the Democratic Party was going to do with the sugar tariff between 1913 and 1916: Isn't that a fact?

A. That is a fact; they thought they were going to remove the tariff; there was a tendency downward.

Q. Do you know the minimum limits during those three years within which sugar stocks fluctuated?

A. I do not remember. They are easily obtainable. I have not them in my head.

The Master: These are this year's quotations?

Mr. Searls: Yes.

The Master: Do you know whether the Hawaiian Commercial and Sugar Company ever went below 6.21?

Mr. Searls: Didn't Union Sugar Company ever go below 16.55 or Kilauea Sugar Plantation go below 15.79?

A. Oh, yes.

The Master: Just a minute, Mr. Searls. I am talking about the first one, the one at the top of the list, 6.21; that is about as low as Hawaiian Commercial & Sugar Company ever went, isn't it?

A. I could not speak from memory, but I should say approximately so.

Mr. Searls: You have not included any of the local public utility stock here, have you, in your list?

A. No.

Q. Do you know on what basis Spring Valley stock was selling during this period?

A. I have not taken the public utilities.

Q. Would you consider that the basis on which local public utility stock was selling an important factor to consider in determining the rate of return?

A. Yes, I should consider that was one investment open to the investor, among others. I left them out because I thought that we are considering a utility, and I thought it would be hardly fair to take other utility rates to compare with. But I should think the investor, during this period, would have put his money in the bank stock, or sugar stock, or railroad stock, or any other of these stocks, including utility stocks, and that that would be the money
1331 market that would confront him when some corporation came into the market and asked for more money.

Q. How much of a study did you give to particular quotations of public utility stocks in making up your paper?

A. None.

Q. Would you be influenced at all by the general run of prices paid for public utility stocks in California in arriving at your opinion?

A. No, I should consider public utility stocks were simply other opportunities for the investor. If the return paid by the public utilities would be low, the investor would be less interested; if high, he would be more interested.

Q. If on examination you should find that the stocks of public utilities in large cities were selling at considerably less than a 7% basis, would that influence your opinion at all as to the rate of return that the investor would expect to get?

A. No; I should feel that if one examined the particular circumstances of each case he would find it was because of the accumulated surplus there, guaranteeing the safety of that stock, which allowed them to sell it at a higher price.

Q. How far is it your experience, Mr. Lipman, that the average investor depends on the published statements of public utility companies as to their net earnings, and how far does he go behind those statements in his investigation?

A. I should suppose that the investor would take the published statements in the first instance, unless he had some reason
1332 for going back of them in a particular case, the way we ordinarily do, we accept the published statement of a corporation.

Q. If a public utility published a statement which showed a fairly healthy condition and an accumulated surplus, and a good earning record for the past few years, and so on, he would be apt to accept that statement and not go behind the statement and try to find out whether they would tell a different story if they were asking to have their rate raised, or something of that sort?

A. It depends on what the investor is trying to do. If he desires to know what the earnings are, I think he would depend upon a statement, if he had no reason why not to depend on the statement. If he is proposing to become an investor in these securities, the chances are he would ask a banker, or bonding house as to things outside the statement. It depends on what you mean by depending on the statement.

Q. I am speaking of an investor, I mean a man who is about to invest.

A. I think as a rule an investor who is about to invest would go and ask somebody that he supposes to know about it. I do not think he would depend on his ability of judging a statement merely by figures.

Q. Do investors come to you for information of that sort?

A. As to whether we think that such an investment is good for them, yes.

Q. How far do you go behind the published statement of a public utility like the Pacific Gas & Electric Company, for instance,
1333 in determining whether to advise your client to invest or not to invest?

A. We do not go beyond them as to the question of earnings, but there are a good many other considerations besides earnings that go into it, the question of surplus that we were speaking about a minute ago being one.

Q. If the company's statement showed that this surplus had been earned and accumulated during the past few years, you would be apt to accept that statement at its face value, would you not?

A. Yes.

On redirect examination the witness testified in substance as follows:

In my opinion a corporation under the circumstances assumed in my cross-examination, that is to say, a corporation having a large amount of capital, an accumulated surplus, and a surplus of earnings over the amount required for interest and dividends, would not borrow an additional \$10,000,000.00 and pay 5½% per year as interest upon it unless it anticipated that it could earn upon this additional investment something in excess of the amount required for the payment of interest.

My testimony has been given in this case from the point of view of the investor and has been based upon my consideration of what the investor anticipates receiving as a return upon his investment. I have not taken into consideration the expense which the corporation issuing its securities would have to incur in paying commissions to investment bankers and other expenses connected with the issuance of securities. I am testifying from the viewpoint of the seller of money. The corporation issuing its securities is the buyer of money. The seller of money must get his price. He can sell his money in one direction at one price or in other directions at other prices. One class of investments open to him includes the securities of public utility companies. I am expressing my opinion as to how much the corporation which is endeavoring to dispose of its securities will have to offer to the investor for the use of his money. The return which I have been considering is the net return to the investor.

When I testified that a public utility operating in this vicinity must be allowed at least 7% as a return on the full amount of the capital required, I meant that it must be allowed at least that return upon the total amount of money values that are necessary in the business. I have made no distinction between capital invested in physical assets and capital used in developing the business or building up the going concern. I consider 7% as the minimum. I do not think that a public utility corporation which has already established its business can obtain additional capital on the basis of a return of less than 7% unless it has already accumulated a substantial surplus and unless its earnings are substantially in excess of the amount required for the payment of interest and dividends upon its outstanding securities. I do not think that an established concern can get new money more cheaply because it is an established concern, but it may be able to do so if it has accumulated a surplus sufficient to safeguard the new investment.

The purpose of accumulating surplus is to afford a margin of safety and to make provision for periods of adversity and unexpected losses. If adversity comes and losses are incurred, the accumulated

surplus may be wiped out completely. If the losses are not incurred, the surplus accumulates.

In my opinion, investors will not furnish the funds required for public utilities unless they can get a return of at least 7% and under some circumstances they may not provide the money even at that rate.

In my opinion, the earnings of a public utility corporation should be at least 7% upon whatever is determined to be the value of its capital.

1335½

VOLUME 5.

In the Southern Division of the District Court of the United States
in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and
Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, et
al., Defendants and Respondents.

*Condensed Statement of Evidence Prepared Pursuant to Equity Rule
No. 75 and Order of Court Approving the Same.*

Endorsed: Filed April 5, 1922. Walter B. Maling, Clerk.

1336 Mr. GEORGE K. WEEKS, a witness called for the plaintiff,
testified in substance as follows:

My name is George K. Weeks. I am 40 years of age and a resident of the City and County of San Francisco.

I am a dealer in investment securities, and have been actively engaged in that business for the past 16 years, first in the City of New York, and since February, 1905, in the City of San Francisco.

Between February, 1905, and September, 1916, I was one of the managers of, and also one of the partners in, the investment banking house of N. W. Halsey & Co.

From September, 1914, to September, 1916, while retaining my interest in that business, I acted as President of the San Francisco-Oakland Terminal Railways, giving particular attention to its problems of reorganization and financing.

Since September, 1916, I have had charge of the business on the Pacific Coast of the National City Company of New York, one of the largest dealers in investment securities in the world. I am now one of the vice-presidents of that company in New York and president of its subsidiary, the National City Company of California. I

have been a member of the board of directors of the Pacific Gas and Electric Company for several years.

I have been on the Board of Directors of many public utilities, and have studied the problems of financing from the utility
1337 standpoint, and have been engaged during the past sixteen years in handling, as a dealer, the bonds of public utilities and similar companies.

The essence of my business has been determining the values of securities, and the rates at which they can be placed on the market. My experience has been all the way from that of a salesman up to my present position. I have come in contact with the money markets of the East—Chicago, New York, and Boston, as well as the money market here in San Francisco.

I have made a study of the cost of money to public utilities under conditions as they have prevailed here in San Francisco for the past four years and have reduced the results of this study in writing.

My testimony will be first as to the going rate of interest which public utility corporations and other borrowers must pay on money borrowed, secured by mortgage on their property. This is a matter of fact, capable of very close demonstration. The official records of Public Service Commissions and the records of banks loaning money on real estate mortgages afford so clear a record that any honest inquirer can easily inform himself. My testimony on this matter is based on continuous personal experience in the purchase and sale of evidences of secured indebtedness. From this testimony I will pass to the more difficult question as to the rate of return
1338 which a going gas utility of the character of the Pacific Gas & Electric Company must earn in order to secure the money for necessary enlargements and extensions of its property. If the rate earned by a going utility is so low that new money is not obtainable for extensions, it necessarily follows that this earning is less than the market rate for an enterprise of its character and that the original investment would not again be made; in other words, the market value of the property has obviously been depreciated or in part destroyed. The question as to the rate of return necessary to secure capital is within certain limits a matter of judgment. My judgment in this matter is based on my experience of sixteen years of dealing in public utility securities; daily contact both with investors purchasing and holding public utility bonds, and capitalists, owners of public utility properties; personal knowledge of utilities which have failed to earn the necessary return to attract new money and which have therefore drifted inevitably toward bankruptcy, as well as the utilities which have been able under normal conditions to secure necessary new capital—although practically all encounter difficulties in this undertaking.

Experience in the financing of public utility and other similar properties has shown that the most practical and most economical method of obtaining the necessary capital has been through
1339 borrowing a conservative proportion, ranging from 50% to 85%, but ordinarily not more than 75%, of capital requirements by the sale of mortgage bonds, the balance of the money re-

quired for the construction or acquisition of physical property, working capital, and the developing of the business, being obtained by the sale of stock. In some cases all of the stock sold is in the form of common stock; in other cases, a portion of the stock is preferred, frequently different classes, such as "First Preferred," "Second Preferred," etc., being authorized and sold.

Logic and experience alike indicate conclusively that the rate of return which a utility must earn on the total investment in its property, in order to be able to raise the capital necessary to its operation, must be in excess of the rate on which it can borrow a portion, say 60% or 75%, of the capital required against a fixed obligation on the part of the owners or stockholders to pay interest on the sum so borrowed and to repay the principal thereof at a definite time, and against the security of a mortgage covering the property of the corporation.

Going Rate of Interest on Public Utility Bonds and Similar Secured Loans.

The "going rate of interest" or the rate which must be paid under the operation of the law of supply and demand to secure capital, varies according to the character of the loan or investment. The rate of interest on thoroughly liquid funds or loans, such as bank deposits, bank acceptances, commercial paper, etc., in my opinion has practically no bearing on the question as to the necessary rate of return on public utility property, and I shall not, therefore, describe such rates. As to loans secured by mortgage on real property, it has been my experience that during the last four years the average rate of interest has, in the case of loans in the City of San Francisco—whether made in the form of mortgages to banks or individuals or in the form of mortgages to a trustee as a basis for a bond issue,—averaged 6%, and as regards loans outside of San Francisco and in rural sections of the State of California, have run from 6% to 8%, with an average rate in excess of 7%. My experience as regards the rates for such loans, which have competed actively with the securities in the sale of which I have been engaged, agrees with a recent bulletin issued by the Federal Farm Loan Board which gives the average rate of interest on farm loans in the United States as 7.4% per annum and in the State of California as 7.6% per annum. In the case of real estate loans, as in the case of corporation bonds, the amount of money which can be borrowed at these rates of 6% to 8% is materially less than the value of the property mortgaged, being ordinarily in the case of real estate loans not more than 60% of such value.

1341 The average rate of interest at which under normal conditions public utility corporations can borrow on bonds issued under an open mortgage, so drawn as to afford a reasonable assurance of raising from time to time necessary new capital, averages about the same as the current rate of interest on city real estate loans in cases where such corporations are showing net earnings double interest requirements. In cases where net earnings fall materially below

the conventional bond standard of net earnings double interest charges, the net cost to the corporation of money obtained from mortgage bonds corresponds more closely to the interest rate on country mortgages.

To state the matter directly, my experience, based on my personal dealings in bonds of this type, is that during the last four years, in the case of public utility corporations in California of the general character of the Pacific Gas & Electric Company, money required and obtainable through the sale of mortgage bonds in an amount of from 50% to 85% of the value of physical properties mortgaged, has cost these corporations at the rate of 6% per annum or more. To be able to borrow at 6% it has ordinarily been necessary that such corporations should show net earnings, after meeting operating expenses, maintenance, and taxes and depreciation, amounting to at least double the interest charges on the 1342 bonds sold. In cases where net earnings remaining after the deductions above specified have amounted to three times interest charges or more, it has been possible for public utilities to obtain money on the sale of their bonds at somewhat less than 6%. On the other hand, in cases where the amount of net earnings has been less than twice interest charges, money obtained from bonds has ordinarily cost such public utility corporations more than 6%. The last representative sale of bonds by a California gas utility, made before extraordinary Government financing had disarranged market conditions, was of \$2,500,000 First Mortgage 6% bonds of the Southern California Gas Company, made with a showing by that company of net earnings, after operating expenses, maintenance and taxes, but before any allowance for depreciation, of 1.8 times interest charges, on an interest bases of 6.40%. If allowance is made for legal services, trustees' fees, or other expenses necessarily incident to the preparation and sale of bonds, the total cost of this money would be more than 6½%.

Speaking generally, then, of normal conditions during the last four years, I testify, based on my personal experience in the purchase and sale of public utility bonds, that the average cost of money to gas and electric utilities of this State, the net earnings of which are approximately double their interest charges, has approxi- 1343 mated 6% per annum, and that it has been impossible for a utility of the character of the Pacific Gas & Electric Company, and showing its general ratio of earnings to interest charges, to obtain money against the sale of its mortgage bonds at an average rate of less than 6% per annum.

The rate of return which an established utility must earn in order to be able to do the financing necessary to the fulfillment of its public obligations must necessarily be in excess of the cost to it of money obtained from the sale of mortgage bonds.

My judgment, based as previously indicated, both on my experience as a dealer in public utility bonds and as a director of public utility corporations, is that the soundest public policy, looking to the desirability of efficient service, the prompt adoption of all desirable improvement in the art, and an ability and readiness on the part of

the utility to make such extensions as will stimulate the development of its territory, requires a rate of return on total investment of from 8% to 10% per annum; that any return less than 8% is very likely to limit the ability of such utility to do the financing essential to the complete fulfillment of its public obligations, and that any rate of return less than 7%, suffered over any extended period, will inevitably render impossible such necessary financing and result in a depreciation in the value of the investment already made.

1344 These conclusions are based primarily upon and are supported by my personal experience. The following statement is added to show more clearly some of the technical conditions bearing on the subject:

(1) There is a fundamental difference between the loan of money against an obligation to repay it in full secured by collateral, which obligation is held by a bondholder or a noteholder, and the position of a stockholder, the owner of a property, charged with all the duties and obligations involved in ownership, including the control and management of the property, the return to bondholders or noteholders of money borrowed from them, with interest thereon, and the performance of all the other obligations of an owner. In the case of public utility property, where the maximum return to the owner is limited by public regulation and where there is, therefore, no chance of large profit to offset the burdens and obligations of ownership, I believe the return on the property as a whole must normally be at least one and one-half times the rate at which the owner can borrow money, up to a conservative proportion of the value of his property, secured by its pledge: i. e., if money obtained by the sale of bonds cost 6%, it would follow that an earning on the property as a whole of 9% would be necessary to justify assuming the obligations of ownership. If money could be obtained on bonds at 5% an ability to earn at least 7½% would be necessary.

1345 etc. I desire to make it clear that this necessary rate of earning is a rate on the property as a whole and not an earning on that portion of the capital represented by stock as contrasted with bonds. It may seem as a first impression that the figure given is high in view of the fact that the owner ordinarily gets back a considerable portion of his investment from bond buyers at the lower rate, say 6%, but it must be realized that no one would be justified in assuming the responsibilities of ownership, including the obligation to repay money borrowed, unless he could make a profit on the money so borrowed over the rate paid for it, in addition to making a return on that portion of necessary investment for which bonds cannot be sold and to cover which the owner must therefore leave in his own money.

(2) The owner of a public utility property must constantly raise new money for extensions and betterments. Unlike the owner of a private property, he cannot elect to stand on his present investment even if he so desires. The contract involved in his acceptance of a franchise necessitates the investment of money from time to time as

required for extensions to serve a growing population or an increasing use. The making of these extensions necessarily involves in due course the construction of additional generating, producing and storage capacity, as well as the construction of mains and services, the installation of meters, etc.; that is to say, an enlargement of the entire operative system.

1346 (3) The owner of a public utility cannot ordinarily raise all of the money required by the sale of bonds even if he is willing to assume the burden of such indebtedness. Investors will not lend money to a corporation by the purchase of bonds, or otherwise, for a comparatively low rate of interest unless a margin of security is provided through investment on the part of the owners (the stockholders) over and above the amount loaned. Aside from this demand on the part of the investors, the Railroad Commission of the State of California has held that a portion of the funds of a public utility should be provided by the stockholders, several decisions indicating that at least 25% should be so provided. This is the converse of the situation outlined in Subdivision (1). There it was pointed out that under the operation of the law of supply and demand, it could not be expected that capital would be obtained to assume the obligations of the ownership except for a return approximately one and one-half times the rate of return for secured loans on property of the same character. The point here made is that entirely apart from the natural demand of investors, the technical conditions of corporation financing, including the public supervision thereof, are such that necessarily the earning rate on a solvent growing property must be in excess of the cost to it of money obtained by the sale of bonds.

1347 (4) Considerable hazard attaches to the ownership and operation of a public utility. Once a franchise is accepted, the operative property of the utility becomes impressed with the public use and the owner is usually in a position where he cannot retire from the business even if he so desires. On the other hand, he is sometimes subjected to competition from the municipalities served and frequently is subjected to competition from other utilities supplying a similar product, as well as the hazard arising from obsolescence and the competition of other kinds of utilities, as for example, an electric company with improved apparatus and service competing with a gas company.

The foregoing testimony applies to the necessary rate of return on a going utility. In order to define more clearly the limitations of my testimony, I may say that if it were desired to obtain capital for the organization from the beginning and the construction of a gas utility property in the City of San Francisco of approximately the magnitude of the gas system of the Pacific Gas & Electric Company here, it would be necessary, in my opinion, in order to obtain the necessary money,—financial conditions being normal,—that capital should be reasonably assured an earning approximately 1% per annum in excess of the necessary earning rate of a going concern.

1348 On cross-examination, the witness testified in substance as follows:

At the present time I am a director of the San Francisco-Oakland Terminal Railways which controls the electric transportation systems across the bay and its subsidiary companies. I am also a director of the California Telephone & Light Company, a telephone and electric lighting and power distributing utility, and the Central California Traction Company which owns and operates an inter-urban electric railway.

I am not a heavy holder of utility stocks. My interest has been in the bonds issued by utilities, ranging, as I said in my testimony, from 60% to 80% of the value of their property.

My connection with the financing of public utilities has been primarily from the standpoint of the investor who is buying public utility bonds and notes. The firm of N. W. Halsey & Co. has purchased directly or indirectly a large volume of the bonds issued by the Pacific Gas & Electric Company, but it has never purchased any of its stock. The par value of the bonds issued by that company is approximately 60% of the total par value of bonds and all classes of stocks outstanding in the hands of the public, eliminating inter-company holdings.

The company has a comparatively small surplus for a concern of its magnitude. I cannot testify as to the present amount but I am sure that it is less than \$5,000,000.00 as against a total capitalization in the hands of the public of about \$125,000,000.00. My testimony was prepared with reference to average conditions as they existed during the four years from the beginning of 1913 to 1917.

I am familiar with the financing done by the Pacific Gas & Electric Company during those years by the sale of its 6% non-assessable first preferred stock, the great majority of which was sold at 82½. The price was advanced in later sales, but I don't know what the average price was. Some sold at 90 and some higher than 90. It was offered to the company's consumers, not through investment brokers but by the company itself through a very original striking publicity campaign, probably the greatest innovation of the kind that has ever been done by any utility.

My information is that part of the common stock of the Pacific Gas & Electric Company was issued as a stock bonus in connection with the issuance of its first bonds. It was necessary to issue the bonds and stock that way in order to obtain purchasers for the bonds at that time. Some of it has been sold to stockholders at 60 and some of it has been issued for properties acquired; some has been issued in the form of common stock dividends representing money paid out of earnings by the company for the retirement of its
1350 bonds.

Even where there is a large percentage of stock issued as a bonus or as dividends, I would consider the selling price of the stock on the market a good indication of the cost of what we call the equity money. While some of this stock was so issued, the company has

put into the investment of its physical properties considerable surpluses which were earned, and to which the stockholders were entitled. It is more economical for the company to invest a part of its surplus earnings in new property than it is to declare it all in dividends and then go out and borrow it back again.

It is not my understanding that the stock of the Pacific Gas & Electric Company is governed very largely by the speculative feature rather than by the values which it is supposed to represent. If course, any common stock is speculative to a considerable degree; it has all of the hazards of ownership attached to it. When the last offer of this stock was made to the stockholders, it was subscribed at 60 and I consider that it was reasonably covered by the value of the company's property. The necessary investment to acquire water rights, etc., is taken into account in considering the value of the company's property, as you cannot buy those things, whatever may be the ruling of any public body, without paying money for them, and you cannot develop a business without its costing you money. My experience has been that the public bodies cut down what actually costs you money to build up, such as going concern, 1351 water rights and some other intangibles.

If we assume that a \$100,000,000.00 public utility with an outstanding bond issue of not exceeding 60% of its capitalization and with conservative surplus on hand and with a well established business requires \$10,000,000.00 worth of new money, I would say that in order to obtain such money it should issue about \$6,000,000.00 bonds and about \$4,000,000.00 stock, and that at par the bonds should bear between 5% and 6% interest. If the bonds were put out at 5% on par they would have cost about 6%, during the years in question, that is to say, the \$6,000,000.00 of bonds would cost about \$360,000.00 annually.

I do not believe that you could get an average cost on the \$4,000,000.00 stock sold. There are so many diverse conditions that apply to the investment in stock that it would be utterly impossible for me to fix an average rate which equity money would cost the company.

The first preferred stock of the Pacific Gas & Electric Company was sold at a time when there was outstanding a large amount of common stock believed by the company and the public to represent very substantial value. The common stock was assessable, and, as a matter of fact, had been assessed when the company had been in a dilemma in the past at the time of the earthquake and fire. This first stock was put out at 60. It was under those conditions that it was possible to sell the first preferred stock at prices of 82½ up and subsequently at a higher price. But even there, this higher 1352 price cannot fairly represent conditions. The only way you can get the cost of that first preferred stock is to take the average cost, because there is a necessary cost in establishing a market either for bonds or stock. After you have once established a market, introduced your stock to the public, got it listed on the exchanges, and demonstrated to the public over a series of years that it is a stable security, you can sell a very small amount of additional stock at a very much smaller cost, but that small amount of stock

does not represent its cost. The cost is the average of all the stock sold. You might have a company with the best established business in the world, and if the stock had not been listed and marketed and known to the public, it would require a great deal of expense and time to introduce it.

If a company were going to sell first preferred stock under the same conditions that the Pacific Gas & Electric Company sold its last issue of first preferred stock, during the years in controversy, I think it would cost the company at least 7%. Of course, no owner is going to assume the obligations of ownership, including the obligation of borrowing this \$6,000,000.00 and agreeing to repay it, unless he can make some profit on the \$6,000,000.00 he is borrowing.

The owners of common stock have had to pay assessments in the past, and they are liable to have to pay assessments in the future, and they have to leave in some of their own money to afford an equity over and above the bonds and first preferred stock. If

1353 the owners of the common stock got together, they could control the company. They are the only stockholders liable to assessment as the first preferred stock is non-assessable. There is something like \$33,000,000.00 of common stock in the hands of the public and about \$23,000,000.00 of original and first preferred stock.

The company could raise money by the sale of its first preferred stock. If you once establish a fair equity you can to a certain extent encroach upon it, but if you go too far you destroy your ability to raise money at all. This company, in my opinion, sooner or later has to establish some additional equity back of its preferred stock. The only reason why it sold its preferred stock was because it had reached the point where it could not sell its bonds to advantage without establishing an equity back of them. It has been forced to borrow money on notes up as high as 10%, so the sale of stock was not a choice, but a necessity. The same thing is going to be reached, in my opinion, very shortly on the sale of the preferred stock. Some additional equity must be provided soon.

I stated that the average rate on secured loans of all sizes and amounts during the three years in question in San Francisco was 6%. I do not think it is a matter of general knowledge that large sums of money have been loaned in San Francisco during the past three years at much less than 6%.

I am familiar with large loans because they are frequently made the subject of bond issues, and the small loans compete with
1354 us in our business. I am not, however, familiar with private loans, but with loans that are more or less competitive. I know that the savings bank rate on secured loans has been, during the period in question, 6% and in the case of some loans 5½%. Of course, there were periods of easy money and periods of higher money rates. On short term loans, like real estate loans, the rate does fluctuate, particularly on special transactions where there may be a difference of 1½%, but with long term bonds, the fluctuation in net cost of money is not so great because it has naturally to be spread over a number of years.

The Pacific Gas and Electric Company General and Refunding Mortgage Bonds were authorized to be sold at $5\frac{3}{4}\%$ in 1913 and 1916, but the average cost to the company has been in excess of 6%. Since the market was established and the bonds have been listed in New York and San Francisco, the company has been able to sell comparatively small amounts at a net cost to it of around $5\frac{3}{4}\%$.

The Spring Valley Water Company has done no new financing during the years in question through the sale of mortgage bonds. They have sold two issues of notes and very recently, since the period in question, they have made a discount bank loan. The average cost to them of the money raised by their notes secured by mortgage bonds has been considerably in excess of 6%. I think very likely

they were making short term loans with banks at less than 1355 6%. They have a great deal of impounded money and, as

I understand it, they consider that they have a preferred claim on a certain amount of accommodation paper from the banks that are holding that impounded money. I do not think that a rate that they may be able to get under those circumstances is particularly representative of anything.

Money obtained by the Western States Gas & Electric Company on its mortgage bonds cost a little less than 6%. Those bonds are first mortgage bonds.

A condition of monopoly or competition is a factor affecting the price which a corporation must pay for money, but it is a factor among many others. The stability of the company is the primary thing. If the company has demonstrated its stability in the face of competition, competition ceases to be a material factor. If, on the other hand, it were permanently established as a public policy that new competition would not be allowed, I think it would be a favorable factor.

I think there is a distinction between the rate of return which a public utility regulating body should allow and that which a court sitting under the fourteenth amendment should allow.

If a company stopped making large extensions into new territory and only borrowed when it was necessary to meet its demands, it might get along with a less rate of return. But in the case of serving territory which it has already obligated itself to serve, my experience is that, while for a short time the company might

1356 restrict its borrowings, it inevitably as a matter of fact gets into a jam with the public authorities, is attacked, competition is encouraged and in the long run it winds up with worse credit and in a worse position than if it had gone ahead and acquired the money necessary to keep fully abreast of the needs of the territory. It would inevitably get into trouble in less than two or three years.

In the case of the Spring Valley Water Company expenditures have been restricted to an extent more than they should have been. In its reservoir capacity and its extension of mains, it has been slower than it should have been in putting in the money necessary to keep a little ahead of the needs of the territory. That particular company is so situated that competition could not make itself felt as

readily as with most of the other utilities. I should say that if a gas company such as this had gone for an equal period of time without necessary extensions, almost inevitably a competing company would have been encouraged by public authority and would have been created. In fact, after the earthquake and fire the City Electric came in here, I think primarily because, for a few months only, the Pacific Gas and Electric Company, on account of the dangerous state of its credit caused by the destruction of its property, was not as quick as it should have been in extending and restoring the facilities which would enable people to buy electric power. That competition
1357 was encouraged by the slowness of a few months only in making the necessary extensions.

If the Pacific Gas and Electric Company cannot earn 7% minimum on its entire property, inevitably it will result in its inability to borrow further money and in depreciation of its existing investment.

The owners of the Hobart Building borrowed money through an issue of first mortgage 6% bonds, which were sold to the public at par. I do not know the exact cost of the money, but it must necessarily have been in excess of 6%.

I purchased for a syndicate the bonds issued by the owners of the St. Francis Hotel. The money cost them 6%.

The owners of the Insurance Exchange Building were able to get money at practically 5½% net on its bonds, for the reason that the owners were large investors and took a portion of the bonds themselves and their bankers were willing to handle the bonds without profit for a concern in which they were interested. If they had been sold under normal conditions, the money would have cost 6%.

When I stated that a new corporation was apt to earn 8% as distinguished from a going concern earning 7%, that percentage is reckoned in each case on the total investment cost, whether that investment represents physical property or so-called intangible property. Intangible property costs money ordinarily. Of
1358 course, I am figuring, from the standpoint of the investor, on the return of the money that has to be put in the organization from the beginning. I meant to indicate this: that if the money had to be gathered together at one time to put over an enterprise of the magnitude represented by this going enterprise, a return greater than that I testified to would be necessary to assure the obtaining of that sum of money. I testified to that to define more clearly the purport of my testimony that a going concern, with a plant, a business, and a franchise, must make an earning of 7% in order to continue to raise the money required for legitimate and necessary extensions.

I am assuming that portions of a plant abandoned or destroyed have been taken care of through depreciation. So that when I speak of investment cost I mean reproduction cost.

Redirect examination:

I did not in my study give particular weight to the financial crises that occurred in 1913 and at the time that the European war began in 1914 because they were temporary. For a few months after the war broke out we had practically a moratorium, and a company could not borrow money for a period. I am referring to what it actually has cost to borrow money or to obtain money during the period covered by my study, when it could be borrowed.

1359 The principles governing the margin of earnings required in connection with obtaining money on bond issues apply in the case of obtaining money on stocks. In the case of stocks there must be a margin of safety measured on the surplus existing after the bond interest and sinking fund are taken out.

The distinction that I have made between the rate of interest at which money might be obtained by a company with an established business and credit and the rate of interest which a company engaged in a new enterprise might have to pay is due, not to the manner in which the money is invested, but primarily to the superior credit of an established concern and partly also to the difficulty of obtaining a large amount of money for an enterprise at one time as compared with obtaining money spread over a period of years.

I stated that, after any particular security has been on the market and is recognized as having a stable value, that facilitates the marketing of other securities of the same issue, but I did not take that particularly into account. My testimony as to the rate included the establishment of the market position of the securities.

The speculative element is necessarily greater in the case of a company that is about to engage in a new enterprise than it is in the case of a company that is already engaged in business and has demonstrated the possibility of carrying on a successful business. I have tried to assume the safety of the principal in all cases.

1360 A copy of the articles of incorporation as amended June 29, 1914, and duly certified by the Secretary of State of the State of California was admitted in evidence and marked plaintiff's Exhibit No. 94.

Counsel for plaintiff stated that it was important to have this document in evidence at this time because the testimony about to be given by Mr. A. F. Hockenbeamer will contain frequent references to the different classes of the plaintiff's capital stock.

The following brief summary of what is shown by the plaintiff's articles of incorporation will suffice for the purposes of this record:

The Pacific Gas and Electric Company was incorporated under the laws of the State of California the 10th day of October, 1905. The principal purposes for which it was organized are to engage in and conduct the business of manufacturing, distributing and selling gas for light, heat and power purposes, the business of generating, distributing and selling electricity for light, heat and power purposes, and the business of acquiring, storing, distributing and selling water for power, mining, irrigating, domestic and municipal purposes. The Pacific Gas and Electric Company is also authorized

by its articles of incorporation to acquire, construct and operate street railroads.

1361 The authorized capital stock of the Pacific Gas and Electric Company as shown by said articles of incorporation was the sum of \$160,000,000.00 divided into 1,600,000 shares of the par value of \$100.00 each. Five hundred thousand of said shares were non-assessable first preferred stock, the owners of which were entitled to cumulative preferential dividends at the rate of 6% per annum. One hundred thousand of said shares were assessable original preferred stock, the owners of which were entitled to cumulative preferential dividends at the rate of 6% per annum after payment of dividends on first preferred stock but before payment of any dividends on common stock. The remaining 1,000,000 shares of said stock were assessable common stock. The preferred stock was preferred as to principal as well as to dividends, the holders thereof being entitled, in the event of the dissolution of the corporation, to receive the par value of the shares held by them before any part of the assets would be distributable to the holders of the common stock.

Mr. A. F. HOCKENBEAMER, a witness called for the plaintiff, testified in substance as follows:

I am 46 years of age, reside in Berkeley, California, and
1362 am the second vice-president and treasurer of the Pacific Gas and Electric Company, the plaintiff in these suits.

I have occupied the position of vice-president and treasurer of the Pacific Gas & Electric Company since February 1, 1908. For the three years preceding that date I was associated with the firm of N. W. Halsey & Co., New York and Western bankers.

Prior to that time I was in the railroad business in various positions, from office boy to assistant to the general manager of motor power of the Baltimore & Ohio Railroad and assistant to the Chairman of the Executive Committee of the Rock Island & Frisco system. These positions brought me into contact with practically all phases of railroad operation and management but not to any great extent with financing.

I have recently made a study of the financial situation of the public utilities operating in the State of California, and a special study of the finances of the Pacific Gas & Electric Company, with a view to determining what the money obtained by it for construction and other purposes has cost it. That study I have reduced to the form of a written statement.

The witness thereupon read, as part of his direct testimony, the following statement:

1363 Direct Testimony of A. F. Hockenbeamer.

Cost of Money to California Public Utilities.

During the three years from February 1st, 1905, to February 1st, 1908, I was associated with the New York firm of Messrs. N. W.

Halsey and Company, Investment Bankers. This firm dealt exclusively in investment securities, purchasing for its own account, and not as brokers entire issues of public utility bonds and thereafter disposing of such issues to investors through offices and selling organizations which it maintained in the principal centers of the United States and Europe. My experience with this firm included examination of the tangible properties of public utilities, verification of their accounts, analysis of their financial condition and financial needs, and the determination generally of the safety and suitability for investment purposes of the securities offered to the firm by these corporations; I also engaged in the preparation of selling data for this firm, and in the actual sales of securities to its clients; I am, therefore, familiar with the principles of investment banking and with the methods and machinery which are employed in bringing together the large amounts of capital required by public service corporations, by means of the sale of investment securities in retail amounts to thousands of private investors, savings banks and other investment institutions scattered over a wide geographical area.

From February 1st, 1908, to the present time I have been either Comptroller, Treasurer or Vice-President and Treasurer of the Pacific Gas and Electric Company. During all of this time I have had, and still have, general charge of the finances of this Company, and have been instrumental or have taken an active part, in the formulation of its financial plans, in the issuance of its securities and in the sale of all the stocks and bonds which it has found necessary to dispose of for the purpose of obtaining money with which to pay indebtedness, refund old obligations, and to pay for the cost of acquisitions, additions, betterments and improvements, including the sale since June, 1914, under a plan originated and executed by me, of \$14,600,000 par value of the Company's first preferred cumulative six per cent stock directly to its stockholders, employees, customers and other investors.

(1) Investors in Pacific Gas and Electric Company Securities.

As this statement proceeds, reference will frequently be made to investors and the money market. There is a distinction in these terms, but no difference in so far as the permanent financing of public utilities is concerned, as their market for money is merely an aggregation of investors.

Allusion has already been made to the machinery necessary for gathering capital for public utilities from many widely scattered investors. The following information, which has been compiled from the Company's records, specifically illustrates this statement:

1364 *Number of Holders of Company's Stock and Bonds.*

Title of security.	Number of holders.	Date of information.	
Capital Stock:			
First Preferred and Original Preferred	6,256	July	31, 1917
Common	2,334	June	30, 1917
Total for Stocks	8,590		
Bonds:			
Pacific Gas and Elec. Co. General & Ref. 5%	6,333	June	30, 1917
Calif. Gas & Electric Corp. Unifying and Refunding Mortgage 5% ...	3,650	Apr.	30, 1917
Calif. Gas and Elec. Corp. General Mtg. 5%	580	Feb.	29, 1917
Bay Counties Power Co. 1st Mtg. 5%	268		
Bay Counties Power Co. 2nd Mtg. 6%	102	Feb.	29, 1917
Valley Counties Power Co. 1st Mtg. 5%	270	Mar.	31, 1917
United Gas and Elec. Co. 1st Mtg. 5%	217	Apr.	30, 1917
Mutual Elec. Light Co. 1st Mtg. 5%	217	June	30, 1917
San Francisco Gas & Elec. Co. Gen. Mtg. 4½%	44	May	31, 1917
Suburban Light & Power Co. 1st Mtg. 6%	845	Apr.	30, 1917
Metropolitan Gas Corp. 1st Mtg. 5%	101	July	30, 1917
Oroville Light & Power Co. 1st Mtg. 6%	505	May	31, 1917
Nevada County Elec. Power Co. 1st Mtg. 6%	6	July	30, 1917
Yuba Electric Power Co. 1st Mtg. 6%	8	Sept.	30, 1917
Calif. Central Gas & Elec. Corp. 1st Mtg. 5%	16	May	30, 1917
Sacramento Elec., Gas & Ry. Co. 1st Consol. Mortgage 5%	93	July	30, 1917
Central Electric Ry. Co. 1st Mtg. 6%	337	Apr.	30, 1917
The Standard Elec. Co. of Calif. 1st Mtg. 5%	77	June	30, 1917
Blue Lakes Water Co. 1st Mtg. 6%	162	June	30, 1917
	65	June	30, 1917

Title of security.	Number of holders.	Date of information.
South Yuba Water Co. Cons. Mtg. 6%	369	June 30, 1917
Edison Light & Power Co. 1st Mtg. 6%	105	July 31, 1917
Pacific Gas Improvement Co. 1st Mtg. 4%	76	Aug. 31, 1917
Livermore Water & Power Co. 1st Mtg. 6%	16	June 30, 1917
Total for Bonds	14,245	
Total for Stocks and Bonds	22,835	

From this record it would appear that the Company's \$138,066,488 of stock and bond capitalization at August 31, 1917, was owned by 22,835 institutions and individuals in average amount slightly in excess of \$6,070. This statement is not absolutely correct but sufficiently so for the purpose of this illustration. The Company's preferred stock, General and Refunding Bonds and Unifying and Refunding Bonds, its three major investment securities with average holdings per investors of \$3,962, \$5,218 and \$5,410 respectively, are characteristic examples of the widely distributed ownership of the Company's stocks and bonds. A great many stockholders make it a practice to leave their stock standing in brokers' names, so that the actual number of stockholders *in* undoubtedly considerably larger than indicated in the above table. On the other hand, there is undoubtedly some duplication due to the ownership by single investors of more than one class of security.

The following table is indicative of the wide geographical distribution of the Company's stock. It presents the condition at December 31, 1916, with all duplications eliminated.

1365	Division.	Number of holders.	Shares.	Par value.
Pacific Coast:	California..	4,713	279,467.42	\$27,946,742.00
	Outside of California	110	9,664.11	966,411.00
Middle States		573	37,907.07	3,790,707.00
Eastern Coast		2,171	216,754.19	21,675,419.00
Foreign		313	36,085.09	3,608,509.00
Total		7,880	579,877.88	\$57,987,788.00

(2) Could the Gas Business in San Francisco Independently Conducted Finance Itself as Well as Pacific Gas and Electric Company?

I have considered the general aspect of the financing of the gas industry in San Francisco if it were being conducted separately and

disassociated from the Pacific Gas and Electric Company. Having in mind the history of the gas business in San Francisco, one of two conditions would undoubtedly obtain in these circumstances:

1st. There would be either two or more independent gas companies competing with each other and with the several electric companies which have been operating in San Francisco for some years; or

2nd. There would be one gas company competing with these electric companies. It would have outstanding a number of underlying bond issues and would be under the necessity of obtaining new capital in part from some form of a junior bond issue and in part from stock.

A general contrasting view of the gas and electrical industry of the State may be had from the following statistics, taken from Vol. 1 of the Report of the Railroad Commission of California covering the year ended June 30, 1916:

Operating Revenues and Expenses, Net Operating Revenues, and New Capital Investments, Years Ended December 31, 1913, 1914, and 1915 (Cents Omitted).

Items.	1913.	1914.	1915.	Increase.	Per cent of increase.
Electric Companies:					
Operating Revenue	\$30,237,917	\$31,586,407	\$33,469,259	\$3,231,342	10.7%
Operating Expenses	17,502,366	17,110,271	17,572,665	70,299	.4%
Net Operating Rev	\$12,735,551	\$14,476,136	\$15,896,594	\$3,161,043	24.8%
New Capital	\$20,486,859	\$25,659,285	\$10,235,577	\$56,381,721	.....
Per cent of increase of net to increase of capital.....					5.61%
Per cent of increase of net in two years (1913 deducted from 1915) to increase of capital in two years (1913 and 1914)					6.85%
Gas Companies:					
Operating Revenue	\$14,130,953	\$14,462,564	\$15,078,239	\$947,286	6.7%
Operating Expenses	9,607,751	9,876,840	10,151,604	543,853	5.7%
Net Operating Rev	\$4,523,202	\$4,585,724	\$4,926,635	\$403,433	8.9%
New Capital	\$4,596,585	\$2,219,480	\$3,283,631	\$10,099,696	.....
Per cent of increase of net to increase of capital.....					3.99%
Per cent of increase of net in two years (1913 deducted from 1915) to increase of capital in two years (1913 and 1914)					5.92%

1366 The commercial history of electricity, broadly speaking, has been one of uninterrupted advance, that of the gas business one of exploitation of new fields of usefulness resulting in making a comparatively small net gain. Without endeavoring to draw fine distinctions, the situation may be briefly charted as follows:

Commercial and Residential Lighting:

Gas at one time used extensively but now largely supplanted by electricity.

Municipal Street Lighting:

Gas at one time used almost universally, now largely supplanted by electricity.

Cooking:

The largest present field for gas use, but being encroached upon by electricity.

Water Heating for Domestic Purposes:

A growing field for gas use, but with electric heating encroaching and with competition from other forms of fuel.

General Heating:

Apparently a large field for gas sales in California, but still regarded as more or less of a luxury with active competition from coal, wood, crude oil and distillate.

General Industrial Purposes:

A recently developed field for gas, but competitive with other heat producing agents such as coal, oil, etc.

The manufacture of artificial gas in California is dependent upon the availability in large quantities and at reasonable prices of crude oil or of residuary products from refining. To a substantial extent, therefore, the gas business of this State partakes of the speculative character of the oil industry, and there is the ever present spectre of the exhaustion or diminution of the oil supply to a point which would render its cost prohibitive for gas manufacture. Such diminution in the supply available for gas making purposes may arise from the depletion of the underground reservoirs, or from advances in the art of refining tending to the conversion of an increasing proportion of the oil production into products which yield a greater profit than the conversion of the oil into gas. Use of crude oil or residuum for the propulsion of ships, a comparatively recent development, has also brought into the field new competitors on a large scale in the purchase of the raw material of gas manufacture. These factors are aside from the contraction of the California fields open to exploitation for commercial purposes by the withdrawal of lands,

oil bearing or supposedly oil bearing, by the United States Government.

The Pacific Gas and Electric Company is not dependent for its entire revenue upon its gas business, but has varied sources of income as indicated by the following statement showing the sources of its gross revenues during the year 1916. This showing may be accepted as typical of the Company's operations for a number of years past:

	Amount.
Gross Revenue from Electric Sales	\$10,100,032
Gross Revenue from Gas Sales	7,438,256
Gross Revenue from Street Railway Operation	442,516
Gross Revenue from Water Sales	427,516
Gross Revenue from Steam Sales	207,391
Miscellaneous Income	509,886
Total	\$19,125,384

1367 The business field of the Pacific Gas and Electric Company is not confined to one city or to one locality, as shown in the following table giving the number of communities and the approximate population served by it on Dec. 31, 1916:

No. Places Served:	Gas.	Electricity.	Water.	Steam.	Street railway.
Directly	48	127	10	2	1
Indirectly	2	48	8	.....	.....
Total	50	175	18	2	1
Population Served:					
Directly	1,165,677	1,152,402	45,350	775,000	75,000
Indirectly	7,800	120,431	17,800	.....	.....
Total	1,173,477	1,272,833	63,150	775,000	75,000

Summary of Population.

Total Cities and Towns	1,335,833
Suburban	381,511

Total Population Served..... 1,717,344

In my judgment the securities of the Pacific Gas and Electric Company, because of the magnitude and varied character of its business, the wide extent and varied character of its territory, inspire more confidence in the minds of investors than would the securities of one or more independent gas companies whose operations were confined to San Francisco and to one line of business only. A good many investors have not yet forgotten the earthquake and fire of 1906. The Pacific Gas and Electric Company passed through this catas-

trophe without defaulting either on its own obligations or those of its subsidiary companies, including the San Francisco Gas and Electric Company, largely because it was in a position to throw into the breach the resources derived from the wide extent of territory outside of San Francisco, from which it drew a large proportion of its revenues.

The foregoing are factors which, in my judgment, would enhance the difficulties of financing a gas business independently conducted in the City of San Francisco and would, I believe, make it highly improbable that it could obtain money in as large a volume and as readily or as cheaply as it is now being obtained by the Pacific Gas and Electric Company.

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(3) Why New Capital Must be Raised.

The Company is compellable under the constitution and laws of the State of California to render satisfactory and adequate service and to extend its facilities to the residents and industries within the territory served by it. The municipalities of the State, including the City and County of San Francisco, possess—and at frequent intervals have exercised—the power of compelling gas and electric companies to incur large expenditures in placing their distribution facilities underground and in accommodating existing facilities to changes in street lines and grades, changes in or the construction of new sewers, water pipes, the tracks of municipal railways and other civic improvements.

In the most profitable and thickly settled territory served by it the Company is subjected to active competition, so that aside from the requirements of law and of sound commercial policy it must, as a matter of self-preservation, keep its plants and system equipped with the most modern and efficient machinery and devices of production and distribution, and to the utmost of its ability keep abreast of the constantly advancing art.

In addition to the large sums of money that will be required for betterments and extensions, entire issues of bonds secured by mortgages on the Company's property are approaching maturity and funds will have to be found for their payment, without any choice in the Company as to whether it will or will not pay these maturing obligations when and as they become due. Based upon the bond issues outstanding at December 31, 1916, the following table shows the amounts of bonds so maturing each year:

Years maturing.	Amounts maturing.
Serially, 1912-1922.....	\$139,000
1921	623,000
1922	23,500
1923	1,495,000
1927	2,149,000
1928	171,000
1929	179,000
1930	3,755,000
1931	1,409,000
1932	1,545,000
1933	11,536,000
1934	183,000
1937	19,748,000
1938	935,500
1939	2,137,300
1941	1,186,500
1942	29,982,000
Total.....	\$77,196,800

1369 The continual investment of large sums in the Company's enterprise and the raising of other large sums for the payment of maturing debts is, therefore, not a matter of choice. It cannot plead lack of funds to escape the obligations placed upon it by law and contract, but must take its securities into the money markets of the world, when and as necessary, and secure, at whatever cost, the large amounts of new capital required by it to fulfill its duty to creditors and its duty as a public utility whose property has been dedicated to the public service and is subject to public regulation.

(4) Amount of New Capital that Must be Raised.

From the date of its incorporation to December 31st, 1916, a period of approximately eleven years, the Pacific Gas and Electric Company expended more than sixty millions of dollars, or at the average rate of about five and one-half million dollars per annum, for the acquisition of new properties and the extension, improvement and betterment of its services and facilities. During this period the Company has refunded a very large amount of indebtedness represented by bonds and notes and the par value of securities sold for all purposes, including the refunding of capital obligations, was \$83,444,500, or at the average rate of about seven and one-half million dollars per annum.

In view of the conditions set forth in this and the preceding section, and in the belief that California's industries and population will continue to grow at least as rapidly as they have in the past, I am of the opinion that in the next five years additional capital will have to be obtained at the average rate of at least \$5,000,000 per annum

and that in some of these years as much as \$10,000,000 may have to be secured.

(5) Machinery for Raising New Capital.

Realizing the necessity it would be under of raising from year to year actually large and, as its business grew, progressively larger amounts of new capital, the Company set about in the latter part of 1911 to develop a financial plan better adapted to the growing magnitude of its financial operations and under which it believed new capital could be raised in the required volume, on the most advantageous terms and under whatever conditions, except the most abnormal, that might prevail in the money markets.

A brief résumé of the principal steps in the evolution of this plan may serve to give a better understanding of its scope and usefulness. These steps were:

(a) Transfer by deed of the properties of all subsidiaries to the parent company and the direct assumption by the latter of all outstanding obligations of these subsidiaries, thus simplifying accounting methods and enabling the presentation to stockholders and investors of financial data and statements in more concise and understandable form and removing, I believe, in a large measure, the doubts, perplexities and perhaps suspicions often engendered in the minds of intelligent investors in the study of the complicated relations between holding companies and numerous owned or controlled subsidiaries.

(b) Authorization in 1911 of a mortgage of \$150,000,000 on all of the then owned or after acquired properties and the issuance of General and Refunding 5% Bonds in like amount, with the reservation of a sufficient amount of bonds to retire all underlying liens at maturity, thus gradually bringing the mortgage nearer to the property and enhancing the value of the bonds in the eyes of bankers and investors.

(c) Reclassification in 1914 of the Company's authorized share capital of \$10,000,000 of 6% Preferred Stock and \$150,000,000 of Common Stock into \$50,000,000 of First Preferred 6% Stock, 1370 \$10,000,000 of Original Preferred 6% Stock and \$100,000,000 of Common Stock. Securing approval of this plan and authorization from the Railroad Commission for the issuance and sale of \$15,000,000 of First Preferred Stock for cash, all of which, except about 2½%, has been sold, and authorization for the issuance of \$10,250,000 of First Preferred Stock to be given in exchange for all of the outstanding issue of \$10,000,000 Original Preferred Stock, thus effecting its retirement. The latter has also been accomplished to the extent of almost 99%.

In formulating this plan, the following principles were kept in view:

1st. That public utilities, both as a matter of practical finance and under the principles declared by the Railroad Commission of California, cannot raise, or will not be permitted to raise, entirely by borrowing, the new capital required by them.

2nd. That the authorized issue of each class of security should be sufficiently large to meet the Company's needs for new capital for a long term of years and thus avoid the necessity for the creation and always costly and uncertain introduction to the investing public of successive new forms and strata of securities which would, of necessity, have to become progressively weaker in deference to the prior rights of earlier and underlying security issues.

3rd. That there ought to be sufficient variety of securities to attract the largest possible number of investors, including the investor who will not place his money in anything but a well secured bond, the one who desires a higher rate of return and is willing to assume a somewhat greater risk in purchasing a well protected investment stock and the investor who, for the sake of a still larger return, is willing to take a correspondingly greater risk.

4th. That securities in a series, if properly designed and graded, and thereafter issued in proper proportion, will strengthen each other and tend to lower the average cost of new capital.

5th. That a large class of investors will not purchase securities at a premium, and that fixed interest and dividend rates must conform to market custom and be such as to permit the sale at some discount of the securities to which these fixed rates are attached.

The status of each of the three security issues incorporated in this financial plan, and from the sale of which new capital will have to be derived in the future, as it has been in the past five years, was as follows at December 31st, 1916:

General and Refunding 5% Bonds:

Reserved for retirement of all underlying bond issues.....	\$47,214,800	
Reserved for additions, betterments and improvements at 90% of cost	70,988,200	
In Treasury	1,000,000	
		<hr/>
		\$119,203,000
Outstanding in hands of public.....		29,982,000
Cancelled through operation of sinking funds		815,000
		<hr/>
Total authorized issue.....		\$150,000,000

First Preferred 6% Stock:

Reserved for exchange for original preferred stock.....	\$310,370	
Reserved for additions, betterments, improvements, etc.....	26,040,500	
		<hr/>
		\$26,350,870
Outstanding in hands of public.....		23,649,130
		<hr/>
Total authorized issue.....		\$50,000,000

Common Stock:

Available for future corporate purposes (Including stock owned by subsidiary companies)	\$65,964,142	
Outstanding in hands of public.....	34,035,858	
		<hr/>
Total authorized issue.....		\$100,000,000

1371 The essential characteristics of each of the three mediums of financing now possessed by the Company are set forth in the following table:

General and refunding 5% bonds.

1. 5% Interest rate on par value.
2. Secured by foreclosable lien on all property now owned or hereafter acquired.

First-preferred stock.

1. 6% dividend rate on par value.
2. Having preference over common stock in any distribution of assets remaining after claims of bondholders and other creditors have been satisfied.
3. Fixed cumulative dividend rate payable before common stock can receive any return.

3. Fixed and obligatory interest rate with right to foreclosure if not paid.

Common stock.

1. 5% dividend rate at present on par value.
2. Not secured and with no claim on assets except any remaining after payment of par value of bonds and preferred stock plus unpaid interest and dividends.
3. Variable dividend rate depending on earnings and payable within discretion of Board of Directors, only after all dividends on preferred stock have been paid.
4. Assessable for all purposes permitted by law, and holders liable for their proportionate share of debts (except bonds with waiver of stockholder's liability).

4. Not assessable and holders only liable for their proportionate share of any debts of the corporation (except bonds issued with waiver of stockholder's liability) incurred while they are stockholders. If any assessment should be collected articles of incorporation provide that same shall be added to par value and dividends increased proportionately.

4. Not assessable.

General and refunding 5% bonds.

5. Definite date for repayment of principal at its full par value.

First-preferred stock.

5. Payable in full out of corporate assets remaining after payment of corporate debts at expiration of corporate existence or earlier dissolution.

Common stock.

5. Represents right to share of assets remaining after payment of debts and par value of preferred stock.
6. Issuance restricted under the Public Utilities Act to the acquisition of property, or for the construction, completion, extension or improvement of facilities, or for the improvement or maintenance of service, or for the discharge or lawful refunding of obligations, not theretofore capitalized.

6. Restrictions as to further issues such as to assure a safe ratio between earnings and interest charges and maintenance of the security of the lien.

6. Issuance restricted under the Public Utilities Act to the acquisition of property, or for the construction, completion, extension or improvement of facilities, or for the improvement or maintenance of service, or for the discharge or lawful refunding of obligations, not theretofore capitalized.

In my opinion, the mechanism available to the Company for raising new capital is well designed, ample and efficient. A more detailed description of the three forms of securities issuable under it follows:

1371½ (6) General and Refunding Mortgage 5% Bonds.

This is a public utility bond of an open issue. The fact that it is a so-called "open issue" and that the supply of bonds on the market may from time to time be increased undoubtedly has a tendency to somewhat lower the price at which it may be sold by the Company. On the other hand, the average price realized for these bonds over a term of years will unquestionably be higher and the cost of money correspondingly lower than under the only alternative plan that could have been adopted, namely, the placing of a series of mortgages on the property, each of which would be further removed than its predecessor in priority of lien, and would have to be sold, as the security grew weaker, at progressively lower prices.

These bonds, with respect to the State of California, are tax exempt and are a legal investment for its savings banks under the supervision of the state banking department. The Company has covenanted to pay the interest in full without deduction for any taxes that it may be required or permitted under any state or federal law to deduct or retain therefrom. Under the income tax law of 1916 this renders the income from the bonds free from the normal federal income tax to the holders thereof. The bonds are secured by a lien upon property having, in my opinion, a value largely in excess of the combined par value of the issue and of all underlying issues outstanding. The earnings from this property are substantially twice the interest on all the outstanding funded debt of the Company. The bonds are issuable under the authority of the Railroad Commission of California, in conformity with the Public Utilities Act, only for extensions, additions, improvements and betterments and for the refunding of underlying obligations, for the retirement of all of which General and Refunding Bonds (par for par) have been set aside, as provided for under the terms of the mortgage. Their issuance is further restricted, by the terms of the indenture securing them, to 90% of the actual cost of extensions, additions, betterments and improvements, and then only when net earnings available for bond interest during the twelve months preceding any additional issue have been equal to at least one and one-half times the interest on all outstanding bonds, including the contemplated issue and also the interest on underlying bonds.

The General and Refunding Mortgage also places on the Company the obligation of creating a sinking fund equivalent to one per cent annually of the par value of all of its outstanding bonds, including all underlying issues and all bonds held alive in sinking funds with the proviso, however, that payments made into sinking funds already established under the terms of underlying mortgages may be credited against this one per cent.

The terms of the General and Refunding Mortgage, including the above recited provisions, are usual and customary in public utility mortgages and are necessary to make salable the bonds issued thereunder and to meet the competition in the investment market of other public utility bonds which are properly safeguarded and restricted in conformity with the customs and practices prevailing in the money market. In my opinion, the Company could not have created, nor could it at this time create, a new or different issue of bonds from the sale of which it could secure money in the same volume and upon as favorable terms as from the sale of bonds issued under the aforesaid General and Refunding Mortgage.

Since 1912, the assets securing these bonds have been largely increased, by the addition of more than \$12,100,000 of cash realized from the sale of the Company's first preferred 6% stock, by the sale for cash of \$3,000,000 par value of common stock, by the reinvestment of earnings in part capitalized by common stock and in part uncapitalized and by the retirement of bonds of this issue and of underlying bonds through the operation of sinking funds. The improved position of the Company's bonds since 1912 by reason of these contributions of stockholders to the assets securing them is shown in the following table, which among other things shows a net increase in four years in bonds outstanding of \$1,298,000 and a total
 1371¾ net cost of plant additions during the five years of \$24,322,475 or an increase in four years of \$16,422,425.

Year.	Bonds outstanding Dec. 31.	Cost of plant additions.	Per cent of gross earnings required for bond interest.	Per cent of net earnings required for bond interest.
1912	\$75,898,000	\$7,900,048	25.7%	60.1%
1913	75,485,800	7,795,624	23.4%	55.0%
1914	75,056,300	2,738,130	21.8%	45.2%
1915	76,172,800	2,209,925	20.1%	39.1%
1916	77,196,800	3,678,746	20.1%	40.3%

In my opinion these bonds are entitled to rank as a high grade investment issue and it is my judgment also that they can be maintained on an assured investment plane, yielding the cheapest procurable capital, only if the future capital needs of the Company be met from the sale of both bonds and stocks in the proportion of not more than 60% to 65% of the former and 35% to 40% of the latter.

(7) First Preferred Cumulative 6% Stock.

This stock is issuable only with the approval of the Railroad Commission of California, in conformity with the Public Utilities Act, for the acquisition of new property, for extensions, additions and improvements and for the refunding of bonds or other obligations. Dividends are paid quarterly and are cumulative; that is, no dividends may be paid on the Company's common stock so long as any dividends on the preferred stock are in arrears. In any distribution

of assets either at expiration of corporate existence or earlier dissolution this stock has preference, up to its par value, over the common stock. If any assessments should ever be collected, the articles of incorporation provide that same shall be added to the par value and dividends increased proportionately. To maintain this stock on an assured investment basis, so that the new capital obtained from its sale may be had at a fair cost, it is necessary, in my opinion, that the value of the Company's tangible assets, after deducting the par value of all of its outstanding bonds, shall at all times exceed the par value of all the outstanding preferred stock.

In the eleven years to December 31, 1916, dating practically from the incorporation of the Company, the assets back of this stock, in addition to those created directly from the proceeds of its issuance and sale or from any appreciation in the value of the properties, have been increased by \$20,892,340 from the following sources:

(a) By an assessment of \$997,900 paid by owners of the old preferred stock in 1907;

(b) By \$2,015,000 through the sale of common stock for cash;

(c) By common stock issued in payment of properties of a cash value of \$124,440;

(d) By \$17,775,000 surplus profits reinvested in the property, other than for replacements and rehabilitation, or used to retire bonds, such surplus profits having in part been capitalized by common stock issued to common stockholders in lieu of cash dividends.

In my opinion this is a high grade investment stock, secured by assets up to its full par value, largely by the investments made or assets contributed by the common stockholders. Under the terms of the General and Refunding Mortgage, bonds secured by it cannot be issued in excess of 90% of the cost of additions, betterments, etc. Based on the net cash cost of additional property acquired or constructed in the five years to December 31, 1916, the remaining 1372 10% would amount to \$2,432,247.53, and on the basis of financing new construction with not to exceed 60% of bonds, this difference would amount to \$9,728,990. The need for a well secured and marketable preferred stock in the Company's scheme of financing is, therefore, obvious, particularly in view of the fact, to be developed later in this statement, that common stock cannot be maintained on a strictly investment basis requiring all or a large proportion of its par value to be supported by tangible assets.

(8) Common Stock.

For reasons which will be developed as this statement proceeds, this stock is a very necessary link in the Company's chain of financing and may be truly characterized as the "Shock absorber" of its financial mechanism. As distinguished from the preferred stock, the common stock, is assessable. Its owners take the major risks of the

enterprise by guaranteeing both the bonds and preferred stock unless, in the event of financial difficulties, they accept the alternative of losing their entire investment. Upon the owners of the common stock rests the obligation of maintaining the tangible assets necessary to support the bonds and preferred stock upon an assured investment plane. What, in my opinion, should be the minimum ratio of these assets to the par value of the bonds and preferred stock has already been stated in preceding Sections 6 and 7, and what are the nature and extent of the influences tending to diminish the necessary minimum ratio is discussed later on in Section 17, dealing with the subject of bond and preferred stock discount and expense.

I use the term "minimum ratio" advisedly. In my judgment there should be a substantial excess of tangible assets above the par value of all outstanding bonds and preferred stock. This duty can be performed only by the common stock and then only when it has become a security marketable at fair prices and in sufficient volume to provide new capital in excess of the accumulating bond and stock discount and expense. In the very nature of the case the investment of the common stockholders cannot, from the standpoint of liquidation or dissolution requiring the payment of the full par value of all outstanding bonds and preferred stock be supported by tangible values. Their money serves to sustain and enhance the credit of the Company, enabling it to secure funds from the sale of the senior securities on reasonable terms, and thus create and maintain a going and growing concern; and it is the value which such a concern has, as contrasted merely with a lot of materials in place, that constitutes one of the valuable equities underlying their investment. This does not, of course, exclude the idea of the existence of tangible values as well. On the "average per share" basis however these are largely dependent upon the rapidity and extent of development and the methods of financing that may be productive of the best results or that the exigencies of any given situation may demand. The Company may sell \$1,000,000 par value of common stock at the price of \$60 per share, and put the entire \$600,000 cash proceeds into tangible properties, and contemporaneously sell \$4,000,000 par value of bonds bearing a five per cent interest rate at an average price of 85, in which case the discount on the bonds would be equivalent to the total amount realized from the sale of the common stock. A physical appraisal then made would show no tangible assets in excess of the par value of the bonds. The situation would be precisely the same if the Company had sold the \$4,000,000 of bonds and the \$1,000,000 of common stock at a price equal to the par value of the bonds alone. In both cases the fixed annual interest charge will be the same, viz., \$200,000; and in both cases if it is assumed that the rate of return necessary to induce the investment of the sum of \$4,000,000 in the enterprise is 6.25%, the Company should pay annually a dividend of 5% on the par value of the stock, for otherwise the reasonable expectations of the investors will not be realized.

1373 At the time of the incorporation of this Company the amount of common stock outstanding was \$20,000,000.

In August, 1907, the entire issue reverted to the Company's treasury through its purchase by the Company at public sale following the failure of the owners to pay an assessment of \$10 per share which had been levied thereon. An assessment of approximately \$1,000,000 levied simultaneously on the preferred stock of the Company was paid. The amount now outstanding was issued for the following purposes:

	Par value.
(1) Sold in 1907 for \$7,523,100 cash in conjunction with Unifying and Refunding 5% Bonds.....	\$8,359,000
(2) Issued in 1907 in the exchange of Pacific Gas & Electric Company Debenture 6% Bonds for a new issue of 6% Debentures at the rate of 100% in new bonds plus 100% in stock for each debenture of the old issue.....	3,883,000
(3) Issued in 1908 and 1909 in exchange of underlying issue of California Gas and Electric Corporation General Mortgage and Collateral Trust Bonds for Unifying and Refunding 5% Bonds at the rate of 100% in Unifying Bonds plus 25% in stock for each bond of the old issue.....	1,063,900
(4) Issued for engineering and other services and in the settlement of indebtedness.....	474,500
(5) Issued prior to March 23, 1912, as dividends to holders in lieu of distribution of cash derived from surplus earnings, said earnings having been re-invested in the property or in the retirement of the Company's funded debt.....	14,628,350
(6) Issued in 1915, under authority of the Railroad Commission, as dividends in lieu of distribution of cash derived from surplus earnings, said earnings having been used to retire funded debt....	1,924,758
(7) Sold in 1910 and 1912 for \$2,015,000 cash.....	3,500,000
(8) Issued in 1912 in part payment for the properties of the South San Francisco Power and Light Company	60,000
(9) Issued in 1913 under authority of the Railroad Commission in part payment for the properties of the Livermore Water and Power Company.....	110,550
Total Par Value.....	\$34,004,058

It is impossible to assign a definite original cash value to the stock embraced in items 1, 2, 3, and 4, which was issued to facilitate the sale of a large amount of bonds at a time when the money was most urgently needed, and one of the major financial depressions in the history of the country was making it exceedingly difficult to secure funds in substantial amounts for corporate purposes. Notwithstanding these extremely unfavorable conditions the Company, with the aid of this stock was enabled to secure money from the sale of these bonds, the fixed interest and discount charge upon which was 5.957%

annually. I personally drew up for the bankers the underwriting prospectus, actually sold bonds to investors with the aid of the stock, and otherwise participated in this financing so that I speak from intimate personal experience in stating that under no other conditions could these bonds have been sold and the Company have been placed in possession of the necessary funds to aid in the payment of its floating indebtedness of approximately \$10,000,000, all of which had been incurred in the expansion of its facilities, and thus avoid bankruptcy. Under the circumstances, however, I assign no definite original cash investment value to the stock embraced in items 1, 2, 3 and 4. The cash investment represented by the entire common stock, based merely on the facts shown in the following table for the eleven years to December 31st, 1916, being exclusive of any appreciation in the value of physical properties or going concern, I state as follows:

1374 Surplus profits reinvested in the property, since incorporation in 1906 other than for replacements and rehabilitation, or used to retire bonds....	\$17,775,000
Cash realized from sales of stock (Item 7).....	2,015,000
Cash value of stock issued in part payment of properties of South San Francisco Power and Light Company and Livermore Water and Power Company (Items 8 and 9).....	124,440
Assessment of 1907.....	997,900
<hr/>	
Total cash investment represented by common stock	\$20,892,340
Average per share for entire issue of \$34,035,858.....	\$61.38

(9) Cost of Capital to Pacific Gas and Electric Company.

Substantially all of the new capital required by the Pacific Gas and Electric Company during the five years from January 1, 1912, to December 31, 1916, has been derived from the sale of securities issued under the financial plan already described. The only exceptions are the secured one-year gold notes sold in 1913 and 1914.

The following tables show for each of the five years in question, and for the entire period with respect to the General and Refunding 5% Bonds, the first preferred stock, and one-year gold notes the par value of the securities sold, the amount of cash realized from these sales, the total discount and expenses, the annual proportion of discount and expense, the annual interest and dividend rates, the total annual fixed charges and dividends and the cost of the money expressed in percentages.

General and Refunding Mortgage 5% 30 year Bonds.

Year.	Par value.	Cash realized.	Discount and expense.	Annual prop. of disc. & exp.	Interest.	Total annual fixed charges.	Cost of money.
1912	\$25,000,000	\$21,250,000	\$4,000,333	\$72,021	\$1,250,000	\$1,322,021	6.22%
1913 .....	.....	.....	.....	.....	.....	.....	.....
1914 .....	.....	.....	.....	.....	.....	.....	.....
1915	3,100,000	2,642,370	462,903	10,044	155,000	165,044	6.25%
1916	1,900,000	1,710,000	210,791	4,800	95,000	99,800	5.84%
Total	\$20,000,000	\$25,002,370	\$4,674,027	\$87,555	\$1,500,000	\$1,587,555	6.30%

First-preferred Capital Stock—6% Cumulative.

				Dividend.			
1912 .....	.....	.....	.....	.....	.....	.....	.....
1913 .....	.....	.....	.....	.....	.....	.....	.....
1914	8,801,300	7,261,073	1,625,773	528,078	544,528	544,528	7.50%
1915	3,785,100	3,158,900	663,416	227,106	234,161	234,161	7.41%
1916	1,123,100	1,032,367	102,896	67,386	68,536	68,536	6.64%
Total	\$13,709,500	\$11,452,340	\$2,392,085	\$822,570	\$847,225	\$847,225	7.40%

One-year Gold Notes—1913, 6%; 1914, 5%.

				Interest.			
1912 .....	.....	.....	.....	.....	.....	.....	.....
1913	\$5,000,000	\$4,784,688	\$258,657	\$300,000	\$558,657	\$558,657	11.67%
1914	11,000,000	10,698,074	332,298	550,000	882,298	882,298	8.25%
1915 .....	.....	.....	.....	.....	.....	.....	.....
1916 .....	.....	.....	.....	.....	.....	.....	.....
Total	\$16,000,000	\$15,482,762	\$580,955	\$850,000	\$1,440,955	\$1,440,955	9.30%

1375 The calculations in the preceding tables of the cost of money take into consideration three elements:

1st. The rate of interest or dividends paid on the par value of the bonds, stocks and gold notes.

2nd. The annual proportion of Bond and Preferred Stock discount pro-rated over the unexpired life of the Bonds and Preferred Stock on a 4% Sinking Fund basis.

3rd. The annual proportion of the expense incident to the issuance and sale of Bonds and Preferred Stock such as trustees' fees, bankers' commissions, attorneys' fees, costs of printing and engraving, etc., pro-rated over the unexpired life of the Bonds and Preferred Stock on a 4% Sinking Fund basis.

In the foregoing statement, if money derived from the sale of bonds is referred to as having cost the Company 6.20%, it will be understood that this is equivalent to saying that it would have been necessary to issue bonds bearing this face rate of interest in order to derive net cash proceeds equal to the par value of the bonds.

Likewise, if the cost of money derived from the sale of Preferred Stock is referred to above as having cost the Company 7.40%, it will be equivalent to stating that it would have been necessary to issue stock bearing this rate of dividends in order to derive net cash proceeds equal to the par value of the stock.

The sales of the securities shown in the preceding tables were accomplished in the following ways:

The General and Refunding Bonds were sold in the customary way at wholesale to investment bankers for distribution among investors.

The First Preferred 6% Stock was sold directly by the Company to its stockholders, employees, customers and other investors at an average expense of ninety-eight cents per share, as contrasted with the usual commissions ranging from \$5.00 to \$10.00 per share which are ordinarily exacted by bankers as compensation for distributing public utility stocks of this character. The distribution of so large an amount of stock without the customary underwriting by bankers was a distinct departure from the ordinary methods of distribution, was accomplished at a minimum of cost, and the plan has since been adopted by a number of other public utilities throughout the United States.

In addition to the securities shown in the preceding table, \$3,000,000 par value of common stock was sold in 1912. This stock was sold directly by the Company to its stockholders at \$60.00 per share, which was slightly less than the market price then prevailing. An underwriting commission of \$2.00 per share was paid to local bankers. This distribution was also accomplished at a minimum expense.

What were the general conditions prevailing in the money market during these five years? During the first half of the period, the world was at peace; during the latter half it was at war. The pre-war period, from a financial standpoint, was fairly normal with periods of stringency predominating. Following the beginning of the war in August, 1914, there was a good deal of confusion and uncertainty for a number of months until the influence of large purchases in this country by the warring nations began to make itself felt, and led to a period of easy money. It was during this period, in January and February, 1917, that this Company sold \$3,060,000 par value of its General and Refunding Bonds at 90½ and accrued interest, being the best price for this security it had ever been able to obtain. The entry of the United States into the war in April, 1917, marked the beginning of a period, still continuing, in which it has been practically impossible for utilities to do any long term financing. High grade stocks and bonds have fallen to extremely low levels, and some of the strongest corporations in the 1376 United States have been compelled to pay very high rates for new capital. The Company's General and Refunding Bonds, which after the above referred to sale to its bankers reached a quotation on the exchanges of approximately 94 and accrued interest have, during the last thirty days, sold as low as 83; in other words, seven and one half points below the price paid by the bankers and approximately 11 points below the quotations established in retail transactions upon the New York and San Francisco Exchanges. This illustrates one of the hazards of the business and also the necessity for an adequate working capital. If the Company had not provided itself with 5.75% money in February, 1917, it would, in my opinion today be paying at least 8½% on short term notes with all the high cost of such means of financing and with the risk of having these notes fall due in an unfavorable market.

At the present time the United States Government is calling upon the loanable funds of the nation in inconceivably large amounts, and under its program of war expenditures aggregating about twenty-two billions of dollars by the middle of next year will, in all human probability, call for still larger loans from the savings of the people, perhaps at even higher rates of interest than the 4% borne by the second Liberty Loan. The competition of government securities has most seriously affected investment bonds and stocks of the safest character and even after the war, until the nation has permanently absorbed the large floating supply of government bonds or the investment securities replaced by government bonds and supplied the large and insistent demand that will undoubtedly be made upon its loanable capital for reconstruction, the bonds and stocks of public utility corporations will, in my opinion, have to be offered upon much more favorable terms to the investor than have prevailed during the five-year period for which I have computed the average cost of money to this Company. At any rate, I do not believe it can be questioned that public utility financing, now and for an unknown period in the future, will be faced with unprecedented and unfore-

seeable conditions differing radically from those prevailing prior to the war.

(10) Distinction Between Stockholders and Bondholders.

I am of opinion that there is a vital distinction between the stockholders of a public utility and its bondholders and that the borrowing of money by a utility, whether it be through the sale of long term bonds in large amounts or by obtaining smaller and shorter term loans at a bank, is merely an incident of management and the rate at which it is able to borrow money is not a fair measure of the compensation that should be allowed to the owners of the utility for the risks of the business and for the liability which they assume in protecting the creditors from whom the money is borrowed; that there is a fundamental difference between the stockholders of a corporation and its bondholders; that the former are partners in the enterprise while the latter are merely creditors; that the former assume the risks of the business while the latter merely loan money secured by the stockholders' property; that the rate of return which would be attractive to a bondholder, who is a creditor entitled to the repayment of a definite sum of money at a definite time with interest thereon, secured as to repayment of principal by the pledge of specific property and further protected by the liability of the stockholders for the debts of the utility, is not the rate of return which would tempt investors to engage as owners in any line of business, public utility or otherwise, assuming as they necessarily would, not only the hazards attendant upon the inauguration and conduct of the enterprise but an absolute obligation to pay the debts of the corporation, and that if to the owners of the enterprise there is not accorded a larger return than to its creditors, capital cannot be found in large volume to undertake the burden of public utility financing, construction and operation.

1377 Two incidents in the history of the Company will serve to illustrate the foregoing. On or about July 15th, 1907, there had been issued by the Pacific Gas and Electric Company and was outstanding and owned by its stockholders \$9,979,000 par value of its 6% cumulative preferred stock and \$20,000,000 par value of its common stock. On July 15th, 1907, for the purpose of raising funds with which to pay indebtedness incurred in the extension and improvement of its facilities, the Company levied upon its stockholders an assessment of \$10 per share; as a result of this action the owners of the preferred stock paid into the treasury of the Company \$997,900 in cash, all of which was utilized for the payment of the Company's creditors, and the common stock, by reason of the failure of the owners to pay the assessment, was forfeited to the Company. During this entire period of financial embarrassment and anxiety to the stockholders, the owners of the bonds of the Company and of its subsidiary and controlled corporations received the interest upon such bonds punctually and in full, while the holders of its Preferred Stock received no dividends from April 1, 1906, to July 31, 1909,

when they accepted common stock issued to them at \$40 per share in lieu of cash dividends for that period.

On January 2nd, 1906, the Pacific Gas and Electric Company purchased nearly all of the stock of the San Francisco Gas and Electric Company at an approximate cost of \$13,181,400; on April 3rd, 1906, by which time it had acquired 153,237 shares at a cost of \$13,465,875, it received by way of return upon this investment a dividend of $1\frac{1}{4}\%$ amounting to \$191,593.75. In April, 1906, earthquake and fire destroyed a large amount of property of the San Francisco Gas and Electric Company. All of this great loss fell entirely upon the stockholders of the Pacific Gas and Electric Company, but the investors in the bonds of the San Francisco Gas and Electric Company and of the Pacific Gas and Electric Company received the stipulated return upon their securities punctually and without diminution.

(11) Margin of Safety—General.

The "Cost of Money" to the Company as shown in the table in Section 9 covers only actual interest and Preferred Stock dividends and bond and stock discount and expense. Any rate of return merely equivalent to this cost would, in my opinion, not only ignore the investment of the common stockholder and the risks of his ownership but would destroy the ability of the Company to obtain new capital.

In the final analysis the major portion of the capital required by public utilities must be obtained from investors. The table appearing in Section 1 of this statement, showing that the ownership of the stocks and bonds of this Company is vested in more than 22,000 holders, emphasizes this statement if anything so obvious can be emphasized. Investors in bonds demand regularity and certainty of income and the repayment at maturity of the principal of the obligations held by them. Investors in the Company's preferred stock demand reasonable certainty and regularity of dividends and assurance of sufficient assets to give them the par value of their stock either at expiration of the Company's corporate existence or earlier dissolution. Opportunity to liquidate their investment in the market at original cost or better is also an important consideration to both the bond and investment stock buyer, in fact convertibility is probably the most important factor in the cost of money. Convertibility rests upon demand, demand rests upon confidence and confidence is largely based upon margin of safety in earnings, well maintained over a series of years. Earnings in excess of charges are the chief barometer by which the market determines a utility's credit and whether it will give to it new capital and at what cost.

1378 The speculatively inclined investor serves a necessary and useful function in taking the hazards incident to the inception of an enterprise, or with respect to going concerns, in purchasing the junior securities which are needed to create the equities, and the earnings arising therefrom, necessary to validate the senior investment securities. His function in the latter respect is becoming an increasingly important one. While these investors assume the

greater risk either for the sake of a larger but more uncertain rate of return, or in the hope of profit from enhancement in the market price of their securities, they also require a real basis for the exercise of their judgment.

It seems self-evident that any public utility which is merely earning its bond interest and dividends does not satisfy the above requirements and cannot dispose of these securities to investors. There must be earned, in addition, a margin sufficiently large to produce conviction in the mind of the investor that his income is insured by this margin against any of the vicissitudes to which the particular business in which he is asked to invest his capital has been subjected in the past and to which it may reasonably be expected to be subjected in the future; also that his investment will have, in the market, a reasonable degree of convertibility without loss. Money is proverbially timid. It does not like to skate on thin ice. The investor is a free agent in the disposition of his capital. Appearances are often accepted by him as realities and in case of doubt he is more than apt to take the safe course and leave alone the security which may be all right but does not look all right. This psychology must be reckoned with.

There is no mathematical formula by which it may be determined just how wide a margin of safety will induce capital to ally itself with any enterprise. Competition with other securities enters into the question and money, on like terms, will gravitate to the concern which has the long uninterrupted interest and dividend record through good years and lean years and whose securities offer the best opportunity for convertibility in a market stabilized by a demand arising from confidence and a supply not prompted by fright or apprehension. It may be stated, broadly, that the amplitude of such a margin must be commensurate with the hazards of the particular business into which capital is invited. These hazards are fixed in the public mind by the location of the enterprise, its character, its management, its past history, its future prospects and other features which I will analyze somewhat in detail from my experience in dealing with the purchasers of our securities during the past ten years. The gas and electric business undoubtedly has inherent risks no matter where conducted. In viewing our conditions, however, the following hazards, real or imagined, but nevertheless potent with investors, have been urged against our securities. I only mention those to which the most importance seems to be given and to which I would personally give weight if I were considering the investment of money:

1st. That California is an earthquake country, and that utility properties are liable at any time to suffer extensive damage from this cause as evidenced by the large loss which was sustained mainly in the Company's gas and electric properties in San Francisco in the earthquake and fire of April, 1906.

2nd. That there is a decided tendency in California toward the municipal ownership of public utilities; that the public ownership of public utilities is increasing in this State; that its laws facilitate

its accomplishment; that municipalities may purchase the most remunerative and vitally important sections of a utility property, leaving less developed and less remunerative portions to the stockholders, depriving them of the best field for future growth, and exposing them to the danger that the interest charges upon outstanding bonds (which unlike the property itself, cannot be condemned and repurchased at an appraised valuation) cannot be fully met, 1379 or if they are met will leave to the stockholders little or no return upon their investment; and that in such cases the determination of severance value is largely speculative and theoretical.

That there is a substantial basis for the fear of investors of the spread of municipal ownership with all its attendant uncertainties is evidenced by the long threatened competition with the electrical utilities in the City of Los Angeles through the municipally owned Owens River project; by the City of San Francisco's widely advertised Hetch Hetchy project with the electrical utilities in this City; and by the recent forced sale of the privately owned gas distribution system at Palo Alto to the City of Palo Alto, and of the Marin Water Company to the Marin Water District.

3rd. That the Company is subjected to severe competition in the principal centers of population from which the bulk of its revenue is derived and that in view of the so-called constitutional franchises under which these companies are operating in municipalities, there is no assurance that this competition may not become more active and widespread in view of the decision of the United States Supreme Court of April 6th, 1914, in the case of *Russell vs. Sebastian* which held that these constitutional franchises are vested property rights of perpetual duration and include the right of making all necessary extensions within such municipalities upon the terms of the original grant, and this notwithstanding the reassuring policy of the Commission to protect utilities in their business field against competition so long as they serve the public properly and adequately at reasonable rates.

4th. That under the laws of this State substantially all of the expenses of the State are paid by public service corporations; that this system encourages extravagance in State expenditures and inevitably leads to the imposition of a constantly higher rate of taxation upon gross earnings, as evidenced by the fact that since this law went into effect in March, 1911, with an initial rate of 4.0%, the rate imposed upon gas and electric companies has been thrice increased, namely; from 4% to 4.6% in 1913, to 5.25% in 1915 and to 5.6% in 1917. This is an increase of 40% in about six years.

The following table shows for each of the eleven years ended December 31, 1916, the gross revenues of the Company, the amount of all kinds of taxes paid and the increase during this period in the Company's gross revenues as compared with the increase in taxes:

	Year.	Gross revenue.	Taxes accrued.
1380	1906	\$8,947,162	\$283,886
	1907	11,342,140	247,262
1908	12,657,305	274,789
1909	13,491,288	320,059
1910	14,044,596	382,880
1911	14,604,609	616,702
1912	14,744,651	622,969
1913	16,202,337	676,163
1914	17,220,503	743,047
1915	18,944,180	849,445
1916	19,125,384	972,565
Total Increase		\$10,178,222	\$688,679
Increase %		114%	243%

By comparing the increase in taxes from 1910 to 1911, amounting to \$233,822, from 1914 to 1915, amounting to \$106,389, and from 1915 to 1916, amounting to \$123,120, it may be realized to what sudden shocks the net income of the Company may in this one item alone, be subjected in the short period of one year.

5th. That the Company's maintenance and operating costs, including the item of taxes may be heavily increased from time to time, and within short period, through the higher prices paid for oil, materials and supplies, wages, etc.; and that, as evidenced by the experience of public utilities, these higher costs must be met from rates which at best can be adjusted but slowly.

The present experience of the Company well illustrates this point. From January 1, 1916, to August 31, 1917, it has made additional capital investments aggregating, after deducting \$2,752,396 for replacements, the sum of \$6,967,326. Substantially all of this new capital is represented by operative properties. In the eight months ending August 31, 1917, the Company has done the largest business in its history, gross operating revenues, compared with the same months of the preceding year, having increased \$752,181. Contemporaneously, its operating expenses and taxes increased \$1,031,746, so that notwithstanding the large additional investment and the larger volume of business, net operating revenues decreased \$279,565.

I incorporate as a portion of my statement in this case the following excerpts from a report made by me to the stockholders of the Company at the annual meeting held on April 10th, 1917:

"Our expenses and taxes in 1916 increased \$353,000, causing a decline in net operating revenue of \$138,000. This upward tendency of costs has become decidedly more marked since the first of the year. The cost of practically everything entering into the products and service which we have to sell has advanced in price and in many items to an unprecedented degree. As a matter of fact,

the purchasing power of the dollar with respect to the bulk of the material entering into our maintenance, replacements, construction and operations has been cut in two, and at present prices it requires about two dollars to do the work formerly performed by one.

1381 We have selected twenty-nine representative articles in common use in our gas and electric departments, and taking the actual quantities of these bought by us in 1916 and applying to these quantities prices prevailing before the outbreak of the war, prices a year ago and prices now prevailing, obtained the following results:

Cost at prices in January, 1914.....	\$617,000
Cost at prices in January, 1916.....	796,000
Cost at prices in January, 1917.....	1,242,000

"The foregoing tabulation is exclusive of oil, which has gone up more than 50 per cent and at present prices will cost us about a million dollars more in 1917 than it cost in 1916.

"It will be noted from the foregoing table that between January, 1914, and January, 1916, there was an average advance in the cost of materials of 29% and between January, 1916, and January, 1917, a further advance of 72%, the total advance for the entire period of three years being 101%. Since this compilation was made prices have gone up still more. There is no public regulation to limit the prices and profits which we are compelled to pay for the materials and supplies essential to the manufacture and distribution of our products.

"In 1910 our taxes were \$383,000. In 1916 they were \$973,000, an increase of \$590,000 or 154% in five years. During this period gross revenues increased 35% and net revenues 50%. During the present year there will be a further increase in our taxes, irrespective of any increase brought about by larger earnings or by 'war taxes': (a) of about \$40,000 due to the doubling of the federal income tax; (b) of about \$20,000 due to the new federal stock capitalization tax; and (c) of about \$65,000 due to the increase in the State's gross revenue tax from 5.25% to 5.60%. We have excluded from this calculation the third and latest form of federal tax, generally known as the excess profits tax, which is still an unknown quantity and in view of the financial requirements imposed upon the Government by the war will probably be modified to produce a much larger revenue than under the act as it now stands."

Since the foregoing statement was made the prices of materials and supplies, notably of crude oil, from which all of our gas is manufactured, have increased still further. In this item of crude oil alone, eliminating any added cost due to increased production, the Company's cost has increased \$1,087,762 in the last twelve months without any advance in rates.

As stated to the stockholders, there is no public regulation to limit the prices which public utilities are compelled to pay for the materials and supplies essential to the manufacture and distribution of their products. Such prices may and do advance over night, and no portion of the Company's business is affected in anything like

the same degree by fluctuations in the prices of materials and supplies as is its gas business. Regulation is predicated on the theory that such costs will be compensated by proportionately increased rates. The process of adjustment is, however, slow. No well conducted utility will apply for increased rates until it is fairly well satisfied that the upward tendency of prices is likely to have a considerable degree of permanency. During this period of trial prices may continue to advance. The utility then proceeds to the collection and marshalling of the facts and statistics necessary to present its case, including valuations, earnings, expenses and other facts relating to its business, many of which involve principles still in a hazy and undecided state, and in doing so spends a large amount of time and labor, for the burden of proof is upon it. Considerable time is then required for the necessary hearings before the regulating body, examination of the Company's evidence and usually independent appraisements and investigation of conditions by the accountants, engineers and other experts of the regulating agency. When the decision is rendered it cannot, in the very nature of things, be made retroactive, and even if it fully supports the utility's contention for increased revenues, the increased costs, which in the meantime have been incurred by the utility, may represent a heavy loss which cannot be recovered.

6th. That the inheritance tax and laws and stockholders liability laws of California are so stringent as to subject trustees and executors of decedent owners of stock and bonds in California corporations to unusual expense, annoyance and delay and investors to unlimited liability.

It is hazards of this character and others inherent in the gas and electric industry generally that make capital timid and result in its not being invested in public utilities if there is not a sufficient allowance in the rate of return above interest and dividend requirements to afford assurance that periods of adjustment, misfortune and stress can be safely weathered.

A very practical demonstration of the disturbance of confidence produced in the minds of investors by the Company's lessened earnings, with other contributing general causes, is found in the present quotations of the Company's three major securities, from which it must derive its future capital needs, as compared with prices in January, 1917, as quoted on the San Francisco Stock and Bond Exchange.

General and Refunding 5% Bonds:				Approx. yield.
Price January	3, 1917	92.875	(sales)	5.62%
Price September	18, 1917	83.75	(sales)	6.37%

First Preferred 6% Stock:

Price January	3, 1917	92.50	(sales)	6.49%
Price September	18, 1917	85.00	(sales)	7.06%

Common Stock:

Price January	4, 1917	63.25	(sales)	7.92%
Price September	18, 1917	46.50	(sales)	10.75%

(12) Margin of Safety Required for Bonds.

My experience has been, and it is my opinion, that if a public utility is unable to show a rate of growth in its net profits commensurate with the additional capital invested in its properties from year to year, or if its net profits decline or remain stationary, its ability to raise new capital becomes impaired, and if the necessary capital can be secured at all, it is only through the payment of high rates. Furthermore, if a public utility is able to show net profits, or is permitted to earn net profits, which are barely sufficient to pay bond interest, its bonds thereupon become speculative securities and if salable at all, can be sold only at a great sacrifice in price and the payment of a correspondingly high rate for the new capital. Furthermore, the ability of an established utility to market its securities at all, or to market them upon reasonable terms, depends largely upon the net profits remaining after providing for the payment of interest or dividends upon such securities and this margin of safety determines in the minds of investors whether any given security affords a safe medium for the investment of their funds. The foregoing principles are so well recognized by both investors and bankers that it is deemed sound practice to insert in the mortgages securing public utility bond issues provisions that make the

1383 amount of bonds that may be issued thereunder dependent upon the net profits of the utility and thus assure, as far as it is possible, a certain fixed relation between the amount of the interest charge of the utility and the amount of its net earnings available for the payment of such interest.

I have examined the mortgages of a number of well established utilities in the State of California, whose business is similar to that of the Pacific Gas and Electric Company, and present the following table which gives, in condensed form, the provisions appearing in the mortgages with respect to the relation that net profits available for bond interest must bear to the interest charges on all of their outstanding bonds, including underlying issues and bonds which it is proposed to issue:

Name of utilities.	Mortgages.	Interest rate, %.	Times bond interest must be earned on all outstanding issues, including proposed new issue.
Northern Cal. Power Co. Cons.	Ref. & Cons.	5	Twice.
Mt. Whitney Power & Elec. Co.	First Mtge.	6	Twice.
Long Beach Cons. Gas. Co.	First Mtge.	6	Twice.
San Joaquin Light & Power Co.	1st & Ref. Mtgs.	5 & 6	Twice.
San Diego Cons. Gas & Elec. Co.	First Mtge.	5	Twice.
California Tel. & Light Co.	First Mtge.	6	One and three-quarters times.
Coast Valleys Gas & Elec. Co.	First Mtge.	6	One and three-quarters times.
Southern California Edison Co.	General Mtge.	5	One and three-quarters times.
Midland Co.'s Gas & Elec. Co.	First Mtge.	6	One and three-quarters times.
Los Angeles Gas & Elec. Corp.	1st & Ref. Mtgs.	5	One and three-quarters times.
Pacific Gas & Electric Co.	Gen. & Ref. Mtge.	5	One and three-quarters times.
Pacific Light & Power Corp.	1st & Ref. Mtgs.	5	One and one-half times.
Southern California Gas Co.	First Mtge.	6	One and one-half times.

(13) Margin of Safety for Preferred Stock.

The First Preferred Cumulative 6% Stock of this Company, which has already been described, occupies an intermediate position between the bonds of the Company and its common stock.

As shown in preceding Section 12, it is a well established rule in the money market that a good public utility bond should have back of it net earnings from fifty to one hundred per cent in excess of the amount required to pay interest on all of the issuing corporation's outstanding secured obligations. The credit gauge for public utility preferred stocks is not so well established. It is, however, the practice among investment bankers specializing in stocks of this character to combine interest charges and the dividends on such stocks and to consider the ratio between these combined charges and the net earnings available for their payment as the credit gauge for such stocks. A very practical reason underlies this custom. A corporation's bond and stock capitalization might be composed of a large amount of bonds carrying interest charges closely approaching the amount of net income available for their payment, and of a relatively small amount of Preferred Stock, and while the ratio between the dividends required on this stock and the balance remaining after the payment of bond interest might, under these conditions, appear to be large, the actual amount of this balance might be relatively a very small margin of safety for the bond interest which might be wiped out by the fluctuations in earnings which are bound to occur. The credit position of a preferred stock is considered fair by investment bankers if combined interest and discount charges and preferred dividend requirements are earned 1.4 times, and is considered high if the net earnings are equivalent to twice the combined fixed charges and preferred stock dividends.

1384 In the two and one-half years ended December 31, 1916,

Pacific Gas and Electric Company sold directly to investors, \$13,709,500 par value of its first preferred stock, largely in the California market where this stock has the advantage of being free from all state, county and municipal taxes and at the time of its sale was also free from the normal federal income tax with respect to the income derived from it by individuals. In the sale of this stock particular emphasis was placed upon the value of the assets back of it and upon the earnings in excess of interest requirements. Applying the foregoing standard of credit used by specialists in the distribution of public utility preferred stocks among investors, the following is obtained with respect to the earnings of the Company in the years 1914, 1915 and 1916 when this preferred stock was sold:

	1914.	1915.	1916.
Net income.....	\$7,306,582	\$8,358,587	\$8,316,501
Interest, discount and Preferred Stock Dividends....	5,275,900	5,146,538	5,392,756
Times interest, discount and preferred dividends earned	1.39	1.62	1.54
Amount Preferred Stock sold	\$8,801,300	\$3,785,100	\$1,123,100
Average price realized from investors	81.53	82.48	90.84
Net return to Investors in Preferred Stock.....	7.36%	7.27%	6.61%

In my opinion, based upon the experience of the last three years, this Company will be unable to finance any of its new capital needs from sales of preferred stock unless it can earn or is permitted to earn a sufficiently high rate of return to create surplus earnings approximately 40% in excess of its combined interest and bond discount and preferred stock dividends.

(14) Margin of Safety for Common Stock.

If it be assumed that some fixed dividend rate on common stock as distinguished from the opportunity of a speculative profit might be sufficient to induce the investment therein of the capital needed to make up for bond and preferred stock discount and expense, it is obvious that both such dividend rate and the margin of safety in respect to earnings for common stock would necessarily, by reason of the greater risk of capital, be greater than the dividend rate and the margin of safety in earnings for the preferred stock—how much greater can only be determined by experience and by a consideration of other opportunities for investment open to the prospective purchaser of common stock.

(15) Utilities Cannot Obtain Needed Capital Entirely from Sales of Bonds.

I am of opinion, based upon knowledge and experience, that public utilities generally cannot construct and enlarge their enterprises entirely on borrowed capital; that is, on money raised from the sale of bonds. With respect to the Pacific Gas and Electric Company I am able to state this as a fact. It has been my experience that money obtained through the issuance and sale of bonds secured by mortgage is the cheapest form of capital obtainable by utilities, as it involves the minimum of risk to the investor. The investor, however, naturally insists that the property pledged for his security shall exceed in value the face amount of the bonds issued against such security. This is not only a well recognized and generally observed principle in corporate financing, but is a principle of ordinary business prudence which other lenders of money

adopt in safeguarding their investment, and which is also recognized by the laws of the United States and of the State of California, the former in prohibiting loans under the Federal Farm Loan Act to exceed 50% of the value of land mortgaged and 20% of the value of the permanent, insured improvements thereon, and the latter in prohibiting savings banks from loaning money on real estate in excess of 60% of its market value. In recognition of this principle it is customary to insert in mortgages securing issues of public utility bonds covenants limiting the par value of bonds that may be issued for purposes of aiding the utility in the payment of the cost of additions, betterments and improvements to amounts substantially less than the actual cost of such additions, betterments and improvements.

I have examined the mortgages of a number of well established public utilities of this state, whose business is similar to that of the Pacific Gas and Electric Company, and present the following table which gives, in condensed form, the provisions appearing in the mortgages with respect to the proportion of the cost of new construction against which bonds at their par value may be issued:

Name of utility.	Mortgages.	Interest rate (per cent.).	Prop. of the cost of new constr. against which bonds may be issued at their par value.
North. California Power Company, Consol....	1st Mortgage.....	6	80%
Mt. Whitney Power and Elec. Company.....	1st Mortgage.....	6	80%
Long Beach Consol. Gas Co.....	1st Mortgage.....	6	80%
San Joaquin Lt. & Power Co.....	1st and Ref. Mtg.....	5 and 6	85%
San Diego Consol. Gas and Electric Co.....	1st Mortgage.....	5	75%
California Tel. and Light Co.....	1st Mortgage.....	6	90%
Coast Valleys Gas and Electric Co.....	1st Mortgage.....	6	80%
Southern Calif. Edison Co.....	General Mortgage.....	5	75%
Midland Counties Gas and Electric Co.....	1st Mortgage.....	6	85%
Los Angeles Gas & Elec. Corp.....	1st & Ref. Mtg.....	5	75%
Pacific Light & Power Corp.....	1st & Ref. Mtg.....	5	85%
Southern California Gas Co.....	1st Mortgage.....	6	85%
Pacific Gas & Elec. Co.....	Gen. and Ref. Mtg.....	5	90%

I am familiar with the Public Utilities Act of California and with the methods of regulation of public utilities followed in conformity therewith by the Railroad Commission. Under this act the issuance and sale of stocks, bonds or other securities is regulated and controlled by the Railroad Commission. This commission exercises the power of prescribing to the utilities of this State the form of their securities, the amounts in which they may be issued, the price at which they may be sold and the purposes to which the money realized from their sale shall be applied. This Commission has not only repeatedly endorsed the principle and expressed the opinion that the utilities of this State should not obtain all their capital from borrowed money—that is, through the sale of bonds—but has specifically stated that not more than 75% of the capital of the utilities of this State ought to be obtained by borrowing. It follows that, irrespective of the conditions imposed under the terms of public utility mortgages, the utilities of this State must reckon on obtaining a substantial proportion of their new capital either from their earnings or from the sale of stock or other unsecured obligations which do not guarantee a fixed or certain return to the investor, and must, therefore, be sold upon terms which compel the utility to pay a substantially higher rate than that for which money may be obtained through the sale of secured bonds.

The foregoing are general but nevertheless mandatory reasons for stock financing. Aside from these, other more subtle and less easily recognized conditions, emphasizing the necessity for this form of financing, are constantly exerting their influence to deplete working assets and to undermine the credit and solvency of any utility faced with the necessity of meeting the needs of a developing territory and of issuing securities conforming in their terms to the requirements of the money market. I present in the following sections some facts and experiences in this respect in support of my judgment that the rights and risks of ownership should be recognized and compensated in the rate of return.

(16) Cash Situation Not Measurable by Income Account.

Cash is the lifeblood of business, and insufficient capital, as disclosed by the statistics of commercial agencies, is one of the most prolific causes of business failures. The Bradstreet Company reports that during 1916 "lack of capital" was responsible for 4,995 failures, being 30.3% of the total failures during that year, and being exceeded only by failures due to "incompetence," which numbered 5,486, 33.2% of the total number.

With respect to the public utility corporations of California, cash can be obtained in the normal course of business from only two sources, namely from current income and from the sale of securities. Under the Public Utilities Act securities may be issued only for the purposes of the acquisition of property, the construction, completion, extension or improvement of facilities, the improvement or maintenance of service, the discharge or lawful refunding of obligations, or the reimbursement of moneys actually expended for the foregoing

purposes not theretofore secured from the issue of stocks, bonds, notes or other evidences of indebtedness, providing the utility shall first have secured authority from the Railroad Commission, which has the power to grant permission for the issue of stocks, bonds, notes or other evidences of indebtedness in the amount applied for, or in a less amount, or not at all, and to attach to the grant of its permission such condition or conditions as it may deem reasonable and necessary. In this connection, I make the observation that it is a fallacy, dangerous alike to the corporation executive and to the investor, to assume that the income account statements prepared under the classification prescribed by law are invariably a true index of the ability of the corporation to meet its cash obligations. In support of this statement I make the following observations on the subject of "Sinking Funds" and "Discount and Expense."

(17) Sinking Funds.

It is customary to insert, in the mortgages securing public utility bonds, provisions for retiring all or substantial proportions of the issues in graded amounts annually during the life of the bonds. Such provisions have the effect of making the bonds more attractive to investors, facilitating their sale and inferentially reducing to the utility the cost of money paid for such borrowed capital. The payment of these sinking funds is as obligatory as the
1387 payment of interest, and among the remedies given to bondholders against default in meeting these obligations is the right of foreclosure. There is no escape from these periodical sinking fund payments any more than there is from interest payments, and they constitute a charge upon the treasury of the Company coming ahead of preferred or common stock dividends unless the utility is permitted and is able to issue and sell some security junior to the bond issue containing the sinking fund provisions and to apply the proceeds to their payment.

I have examined the mortgages of a number of well established utilities in the State of California, whose business is similar to that of the Pacific Gas and Electric Company, and present the following table which gives in condensed form the sinking fund provisions appearing in these mortgages, the bond issues used for this illustration being the same as those cited in Sections 12 and 14.

Names of utilities.	Mortgages.	Interest rate.	Sinking fund provisions.
Northern Cal. Power Co. Consol....Refunding & Consol.		5%	1% per annum of all outstanding bonds.
Mt. Whitney Power & Elec. Corp....1st Mtg.		6%	1% per annum of all outstanding bonds, to retire bonds at not over 110 and interest. Beginning Oct. 1, 1919, 1% additional on all outstanding bonds to be applied to increasing value of property covered by bonds.
Long Beach Consol. Gas Co.....1st Mtg.		6%	1% per annum of all outstanding bonds for redemption of bonds; also 1% additional annually to be expended for permanent extensions or added to sinking fund.
San Joaquin Light & Power Corp....1st and Ref. Mtg. ... and		5% and 6%	Commencing Aug. 1, 1915, \$145,000 annually to 1919; \$150,000 annually 1920 to 1924; 2½% annually of all bonds outstanding 1925-1929; 3% annually 1930-1934; 3½% annually 1934-1939; 4% annually 1940-1945. Half of these payments may be invested in new property, balance must be used to retire bonds.
San Diego Cons. Gas & Elec. Co....1st Mtg.		5%	3% annually of outstanding bonds 1910-1914 and 5% annually from 1915-1938; applicable to retirements and renewals.
California Tel. & Light Co.....1st Mtg.		6%	1½% annually of all outstanding bonds 1916-1925; 2% annually 1926 until maturity; fifty per cent applicable to additional property.

Names of utilities.	Mortgages.	Interest rate.	Sinking fund provisions.
Coast Valleys Gas & Elec. Co.....	1st Mtg.	6%	1% annually of all bonds issued, beginning 1918.
So. Calif. Edison Co.....	Gen. Mtg.	5%	2% annually of all bonds outstanding; may be applied to retirement of bonds or for permanent improvements.
Midland Counties Gas & Elec. Co....	1st Mtg.	6%	2% annually of outstanding bonds, half to be used to retire bonds and remainder for permanent improvements.
Los Angeles Gas & Elec. Corp.....	1st and Ref. Mtg. ..	5%	2% annually of all outstanding bonds.
Pacific Gas & Electric Co.....	G. & R. Mtg.	5%	1% annually of all outstanding bonds, to be applied to bond redemptions.
Pacific Light & Power Corp.....	1st and Ref. Mtg. ..	5%	1% annually of all outstanding bonds to be applied to bond redemptions.
So. Calif. Gas Company.....	1st Mtg.	6%	1921-1925, \$60,000 annually; 1926-1930, \$75,000 annually; 1931-1935, \$90,000 annually; 1936-1940, \$110,000 annually; 1941-1945, \$125,000 annually; 1946-1950 \$140,000 annually.

In my judgment, there is no essential difference in principle between the payment of an entire bond issue at maturity and the partial retirement of an issue of bonds, in installments, prior to maturity through the operation of sinking funds; and if in either case payment for the bonds is made out of surplus profits, the Company is entitled to reimburse its treasury by the issuance and sale of other available securities.

1388 This also implies that the cost of redeeming bonds, whether of a whole issue at maturity or by means of sinking funds, is not chargeable against income, particularly when, with respect to the sinking funds of the Pacific Gas and Electric Company, there is no provision in the deeds of trust creating the sinking funds requiring the Company to maintain them from earnings. The bondholders' rights are not impaired by the application of this principle if junior securities are issued in lieu of the bonds retired. But the fact remains that, if junior securities cannot be disposed of in sufficient amounts before the sinking fund payments become due such payments must be made out of capital, accumulated surplus or current income.

The sinking fund payments of the Pacific Gas and Electric Company during the period from 1912 to 1916, inclusive, are shown by the following table:

Sinking Fund Payments, Five Years to December 31, 1916.

Year.	Par value of bonds retired.	Cash cost of bonds retired.	Means by which cash was raised.		Total cash.
			From earnings.	By sale of common stock.	
1912	\$1,015,200	\$982,878.21	\$16,458.76	\$966,419.45	\$982,878.21
1913	514,000	505,683.96	463,378.72	42,305.24	505,683.96
1914	378,500	372,380.00	372,380.00	.....	372,380.00
1915	1,869,500	1,838,808.63	1,838,808.63	.....	1,838,808.63
1916	772,500	774,075.00	774,075.00	.....	774,075.00
5 years	\$4,549,700	\$4,473,825.80	\$3,465,101.11	\$1,008,724.69	\$4,473,825.80

(18) Bond and Preferred Stock Discount and Expense.

Bond discount results from the sale of bonds at less than their par value, and is the difference between the amount realized from their sale and the par value thereof which must be paid to the holders at maturity. It is essentially deferred interest, the collection of which the purchaser foregoes until the due date of the obligation. The logical identity of interest and bond discount may readily be grasped from the observation that if the utility could always fix the interest rates on its bonds so that it could realize par for the latter, there would be no bond discount but there would be, instead, added interest charges equivalent to it.

The sale of public utility bonds at par or at a premium, or at varying rates of interest to meet the ever changing conditions in the money market, is not practicable as investors are reluctant to purchase bonds at par or at a premium. The payment of a premium means to them a loss at maturity of a portion of their principal unless in the meantime they have set aside annually a portion of their interest to offset this loss. For the majority of investors this is impracticable and very few would care to take the trouble. On the other hand the purchase of a bond at a discount, which means receiving more at maturity than was paid, has attractions not associated with bonds purchased at par or at a premium. Varying rates of interest on various issues of bonds under the same mortgage are frowned upon by investment bankers owing to the adverse influence upon the market of bringing out bonds with higher rates than those borne by bonds previously issued.

1389 Bond discount is, therefore, a condition which must be recognized as obtaining permanently in any broadly designed scheme of public utility financing.

The accounting regulations prescribed under authority of the laws of this State with respect to the handling of bond discount and expense conform to the generally recognized practice and read as follows:

"Amortization of Debt Discount and Expense.—Charge to this account at or before the close of any fiscal period that proportion of the unamortized discount and expense on outstanding debt which is applicable to the period. This proportion shall be determined according to a rule, the uniform application of which during the interval between the issue and the maturity of any debt will completely amortize or wipe out the discount at which such debt was issued and the debt expense connected therewith. Such amortization may at the option of the corporation be earlier effected by charging all or any portion of such discount and debt expense to Account No. 114-G, "Other Deductions from Surplus," immediately upon issue of the debt or thereafter."

Let me assume, by way of illustration, that a public utility, for construction purposes sells at 85% of their par value \$10,000,000 of 5% bonds maturing in 40 years and secured by a mortgage upon

its property. It obtains \$8,500,000 cash for the \$10,000,000 of bonds.

There is also a condition in the mortgage securing these bonds limiting the par value of bonds that may be issued to 90% of the cash cost of construction. The utility is now in this position:

(a) It must invest in its new construction.....	\$11,111,111
(b) It has received from the sale of its bonds.....	8,500,000
<hr/>	
(c) It must obtain from some other source cash for the difference of.....	\$2,611,111
(d) Of the amount at (c) Bond Discount represents.....	1,500,000

Assuming now that the utility, with an unexpired corporate life of forty years, sells a 6% preferred stock at 85% of its par value to secure the \$2,611,111 cash shown at (c) it finds itself at the completion of the transaction in the following position:

(1) Reproduction value of properties.....	\$11,111,111
(2) Bonds sold—par value.....	\$10,000,000
(3) Preferred stock sold—par value....	3,071,990
<hr/>	
	\$13,071,990
<hr/>	
(4) Balance of capitalization not represented by tan- gible values, being the accumulated bond and stock discount	\$1,960,879

The \$10,000,000 of bonds would now be secured by a mortgage lien on assets worth \$111,111,111 and if the mortgage should be immediately foreclosed and the property sold for cost the amount left for the holders of \$3,071,990 par value of preferred stock would be only \$1,111,111, being only 36% of the amount the preferred stock would be entitled to receive upon corporate dissolution or earlier liquidation and only 43% of the cash paid by the investors in the preferred stock.

The utility has obligated itself to return \$13,071,990 in 40 years; it has tangible properties worth \$11,111,111. If it properly maintains these properties during the 40 years, ignoring for the 1390 purpose of this illustration the question of accrued or unrealized depreciation and also of fluctuations in the prices of labor and materials, the property at the end of the 40 years will still be worth the same amount, but will lack \$1,960,879 of the amount required to discharge the obligations then due to the bondholders and preferred stockholders. To provide against this contingency the utility sets aside each year out of its earnings a proportionate amount of the deficit of \$1,960,879. It could invest this amount in good negotiable securities, in its own securities, place it in the bank and re-invest it in the property, but no matter what course is adopted, the accumulated fund would in effect be turned over to the bondholders and preferred stockholders in addition to the properties, so that no one derives any benefit from this so-called amortization except the bondholders and preferred stockholders.

The foregoing clearly shows that the amortization of bond and stock discount merely represents added cost of money. It also illustrates how the investment value of preferred stock may be destroyed, unless at the time the bonds and preferred stock are sold the bond and preferred stock discount is made up by the issuance and sale of common stock. Assuming that the common stock issued for this purpose is sold at par, if the bond and preferred stock discount are fully amortized out of earnings before the maturity of the bonds and the liquidation of the Company, the effect of the amortization of the bond and preferred stock discount will be merely to reimburse the common stockholders for the money initially invested by them, and restore the parity between the actual value of the assets and the par value of the outstanding bonds, preferred stock and common stock. Until this reimbursement by means of amortization is completed the value of the assets will be less than the par value of the securities outstanding.

The seriousness of the problem of bond discount is practically in direct ratio to the growth of the utility and the consequent necessity of issuing large amounts of investment securities in order to provide the facilities necessary to serve the public. Rapid expansion of facilities may also accentuate the problem by lowering the prices obtainable for the utility's securities owing to the larger supply placed upon the market. The problem with respect to the Pacific Gas and Electric Company may be correctly illustrated as follows:

First.

The actual net cash cost of the Company's construction during the five years ended December 31st, 1916, amounted to \$24,322,475.35:

The average price realized in these five years for the 5% General and Refunding Bonds and the 6% First Preferred Stock was 84.77% of the par value, the average discount being 15.23%. Applying this percentage of discount to the total construction expenditures above shown gives a total combined bond and stock discount of \$3,704,313. This is the gap between the cash actually expended for construction in these five years and the cash realizable from the sales of bonds and preferred stock of the par value of \$24,322,475 at the average prices obtained during the same period.

Second.

The actual net cash cost of the Company's construction during the five years preceding January 1st, 1912, amounted to \$18,150,066.23. Using the same average price for bonds and preferred stock used in the first illustration gives a total bond and stock discount of \$2,764,255.

I have added this second illustration to emphasize the fact that the conditions creating bond discount are continuous and cumulative and will only cease if and when stagnation sets in and the demands for service cease to grow.

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Third.

In the actual discount and expense incurred during the five years ended December 31st, 1916, in selling the bonds and preferred stock shown in table in Section 9 of this statement.

Total par value of bonds and first preferred stock sold..	\$43,709,500
Total cash realized.....	37,054,710
<hr/>	
Discount for five years.....	\$6,654,790
Expense for five years.....	411,322
Total Discount and Expense.....	7,066,112
Average Discount and Expense per year.....	1,413,222
Annual amortization at end of five years.....	112,210

This illustration more nearly represents actual conditions than either of the preceding calculations, as it includes not only bonds and preferred stock sold for construction, but for refunding purposes as well.

In my opinion, bonds and preferred stocks must have their value based on tangible properties equaling or exceeding their full par value. In my judgment this condition must be met, if money is to be obtained on reasonable terms, and it is useless to argue with investors that physical values back of their security are being gradually built up through annual amortization, as the question ever present in their minds, if bondholders, is—what will our situation be in the event of foreclosure tomorrow or next day; and if preferred stockholders—what will our situation be in the event of foreclosure or dissolution before amortization has been completed. They may also ask themselves what their situation will be in the event of the property passing into public ownership.

In my judgment, based on the facts embodied in this statement, the Company during this five-year period could not have sold its General and Refunding Bonds and its preferred stock except for the fact that the common stockholders, by the purchase of common stock for cash and by allowing surplus earnings to be reinvested in the property, had maintained the value of the assets underlying the outstanding bonds and preferred stock of the Company to at least the full par value thereof. This condition, in my opinion, not only enabled the Company to sell its General and Refunding Bonds and first preferred stock, but to dispose of the same upon reasonable terms.

In my judgment when bonds or shares of preferred stock are sold for the purpose of applying the proceeds to new construction or the refunding of existing obligations and such proceeds are insufficient, because of the necessary sale of such securities at less than their par value, utilities should be permitted to reimburse their treasuries through the issuance and sale of some form of security. Bonds obviously cannot be resorted to in this Company's situation and I think it is equally obvious that we should not cut values from beneath the preferred stock by capitalizing discount through that medium. It is therefore entirely clear to me that the burden of this financing must

fall upon the common stock, and that the investors in this stock must be compensated for the risk in taking a security which might not, in the event of dissolution or liquidation, before the amortization of bond and stock discount and expense has been completed, be represented by property having a value equal to the amount of their investment.

(19) Competition for Investment Funds.

I am able to state from my own experience as a private investor, from my experience in investment banking, and in the direct sale of this Company's securities to investors, that there is active competition for available investment funds, and that under fairly similar conditions these funds will gravitate into the securities offering the highest rate of return. The money available for investment represents merely the savings of the people. It is, therefore, limited in amount. Of the amount that is available, whatever it may be, a substantial proportion is held by the very conservative investor or the investor who, by law, is limited to securities meeting certain requirements. This class of investors includes banks, insurance companies, trustees, executors, etc. These purchase mainly such securities as government, state, county and municipal bonds, and the best grade of railroad bonds, real estate mortgages and other securities legal for savings banks and investment institutions. Stocks of all kinds are generally excluded from this category, and bonds of gas and electric companies are not, except to a limited degree, made available by law for savings bank investments. I have been personally engaged with the Chairman of the Public Utilities Committee of the Investment Bankers Association of America in an effort to formulate conditions upon compliance with which bonds of gas and electric companies may be legally available for investment of funds of savings banks and similar institutions.

At the other extreme are investors whose funds go to a large extent into enterprises of a speculative character. Public utility bonds and investment stocks occupy, what might be termed a middle ground, and in this field there is very active competition for capital not only among public utilities, but by a very large number of other business enterprises. It seems in order, therefore, to inquire whether or not gas and electric companies, in competing for these available funds, enjoy any particular advantages that will attract capital, and also to inquire what profits are derived from investment in other business enterprises.

(20) Competition with other Enterprises.

Is public utility capital guaranteed against loss, or does it enjoy any special advantages or immunity from hazards to which capital invested in other enterprises is subject? Is it less liable to be impaired or destroyed by a lack of skill, foresight, courage and judgment in management? Predicated upon the statement that the gas and electric business is essentially one of manufacture and distri-

bution, differing only from other manufacturing and merchandising enterprises in the kind of goods that are produced and in the means and methods of distribution. I present an analysis of certain conditions peculiar to public utilities, and others generally applicable to other business enterprises.

Right of Eminent Domain.

This is possessed by public utilities in the State of California. It enables them to condemn lands for rights of way and other purposes necessary in the conduct of their business, which otherwise might be unobtainable except at higher cost, or possibly make necessary some alternative construction at higher cost. The Company's investment is, therefore, reduced, in theory at least, but inasmuch as the rates to the public are based on the value of the property used in serving it, the public is benefitted by having the Company's invested capital as low as possible.

Use of Public Streets and Highways.

The public utility places its distribution pipes and wires underground or overhead and is required, under bonds of indemnity, to restore the street or highway structure to as good a condition as it was in before it was disturbed. It uses the streets and highways with its service vehicles, but in this respect is merely on a parity with the public generally and with other manufacturers and merchandisers in the distribution of their products. If the utility were not permitted to use the public thoroughfares its investment for private rights of way and easements would be vastly increased, and for this it would have to be compensated by the public so that in the final analysis unless an allowance is made in the rating base for this right, the public is the real beneficiary of the right enjoyed by the utility in the occupancy of such thoroughfares in a manner which does not in any sensible degree interfere with their use by the public.

Competition.

Relatively few manufactured products, excepting those protected by patents, are sold on any other than a competitive basis, but so are this Company's products, actually and potentially, as already pointed out. The utility is at an added disadvantage, however, from the fact that, under the laws of this State which prohibit discrimination in rates, any reductions made by this Company to hold its existing business against competition or to secure new business bid for by competitors may have to be extended to a large number of customers whether in competitive territory or not, thus causing the utility to suffer a horizontal reduction in its revenues with practically no diminution in its investment, which may be rendered partially idle by the detachment of customers, and with practically no diminution of its overhead expenses, but rather with an increase in the

latter due to the necessity of employing a large number of solicitors to maintain its business.

Competition is also encountered by the utilities from substitutes for their commodities such as kerosene, gasoline and acetylene for lighting, and coal, wood and crude oil for heating.

Regulation.

The utility's rates, service and expenditures of new capital to serve the public are subject to regulation and compulsion, and its profits fixed at definite limits on rating bases variable in their calculation and involving a number of unsettled and controverted principles. Unregulated businesses may take full advantage of the law of supply and demand without such limitation of profits. They may raise prices overnight to take advantage of increased demand or to offset increased cost of production.

Mobility of Capital.

Public utility capital, once dedicated to the public service, is irretrievably and immovably fixed. The plant for manufacture and distribution, once constructed, must remain where it is notwithstanding that conditions may render it unprofitable. If population and industry retrogress in any locality served by it, the utility cannot diminish its investment correspondingly or remove its plant, as can the manufacturer or merchandiser, to some other place where greater prosperity and growth prevail, or where other conditions may be less irksome and costly.

Economic Limitations Upon Prices.

Increasing prices have a tendency to diminish demand, and such lessening demand is usually in inverse ratio to the degree in which the manufactured article is a necessity. Gas and electricity are necessities of everyday life only to a degree. There are economic limits beyond which the prices of these commodities may not go without lessening or destroying their use, the converse of which has frequently been pointed out in decisions of the Railroad Commission, that lower prices stimulate demand. This economic limitation on prices may well impair the investment value of a utility's plant even though it be allowed to earn a rate of return which is theoretically compensatory but is actually unreachable.

New Capital.

The public utility is by law compelled to enlarge its facilities to meet public demand, and consequently is without choice as to investing new capital. On this new capital its rate of return is limited. The manufacturer undoubtedly is often compelled to invest

additional money to meet changes in the art and increased demand, but has substantially a free choice in the matter, being governed only by the anticipation of commensurate profits.

1394 Public utility securities are perhaps more standardized than industrial bonds and available in more numerous issues, and for these reasons have a greater vogue with investors. In my judgment, however, they enjoy no markedly better credit than manufacturing enterprises of importance and well established reputation. The General and Refunding 5% Bonds of the Pacific Gas and Electric Company, are at this time selling around 84, netting the investor $6\frac{1}{4}\%$, and its Unifying and Refunding 5% Bonds, a closed issue, are selling at 94, netting the investor $5\frac{1}{2}\%$. With these may be contrasted the following quotations from recent sales of a few manufacturing companies' bonds, as reported in the "Commercial and Financial Chronicle" of September 22, 1917:

Name of issue.	Interest rate.	Maturity date.	Sale price.	Date of sale.	Yield.
Amer. Agricultural Chemical Co.....	1st 5%	1928	100	Sept. 1917	5.0%
Amer. Smelting & Refining Co.....	1st 5%	1947	91 ¹ / ₈	Sept. 1917	5.6%
Amer. Tobacco Co.....	Gold 6%	1944	119	Sept. 1917	4.7%
Baldwin Locomotive Works.....	1st 5%	1940	101 ¹ / ₂	July 1917	4.8%
Central Leather Company 20-year.....	Gold 5%	1925	98	Sept. 1917	5.3%
Corn Products Refining Co.....	Gold 5%	1931	97 ¹ / ₄	July 1917	5.3%
National Enamel & Stamping Co.....	1st 5%	1920	99 ¹ / ₂	June 1917	5.2%
Union Bag and Paper Co.....	1st 5%	1930	82 ³ / ₄	Aug. 1917	7.0%
Western Electric Co.....	1st 5%	1922	98 ³ / ₄	Sept. 1917	5.3%
Bethlehem Steel Co.....	1st 5%	1926	99 ⁷ / ₈	Sept. 1917	5.0%
Indiana Steel Co.....	1st 5%	1952	100 ¹ / ₂	Sept. 1917	5.0%
United States Steel Corp. Coupon.....	5%	1963	101 ¹ / ₂	Sept. 1917	4.9%

Supply of Raw Materials.

Hydro-electric companies undoubtedly enjoy a unique advantage in having an everlasting source of power. The gas industry in the State of California is, however, dependent upon an adequate supply of crude oil at prices which will enable utilities to keep the price of their product within economic limits, and the exhaustion of the crude oil supply or its continually greater conversion into refined products yielding a greater profit to the producers and refineries than the sale of crude oil may subject the gas industry of the State to a severe dislocation. The constant efforts of chemists and investigators is to extract a larger and larger proportion of refinery products from the crude oil. The situation may be summed up in the statement that the gas industry of California at best is no more stable than the oil industry, which is generally regarded—and rightly so, I believe—as being as hazardous as the mining industry.

Sale of Products.

Manufactured products do not sell themselves. They are marketed by selling organizations and through advertising. Gas and electricity do not entirely sell themselves, and utilities must advertise and must maintain selling organizations and exercise ingenuity in broadening the field for their wares, demonstrating new uses and urging the adoption and substitution of their products for other means of power, lighting and heating. Other manufacturers are not restricted in the profits that may arise from their selling ability or enterprise, but utilities are, and if their larger output reduces fixed charges and other costs per unit the public generally gets the benefit.

Advantages from Economy.

If the manufacturer installs labor saving machinery, or by other means reduces his production costs, he is free to reap the benefit in larger profits, but under regulation, limiting the utility to a fixed rate of return on its investment, the eventual result is that the utility gets no benefits to reward its good management, foresight and enterprise.

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Patents.

Manufacturers owning or controlling patents or patent rights are not restricted in the profits they may derive therefrom. Rather were the patent laws of the United States designed to encourage inventiveness by guaranteeing to the owners of the patents for a period of seventeen years all the profits they are able to derive therefrom. Public utilities, on the contrary, if they are limited to a fixed rate of return on the money invested by them, can derive no additional profit from their patents, such as the patented oil gas making process which this Company possesses. Patented devices brought out by industries

allied to the gas and electric industry do frequently enlarge the Company's sales, but not always, as evidenced by this Company's loss of revenue when the carbon filament lamp was supplanted by the modern filament lamp, which, with the same quantity of current, gives about four times the amount of light obtained from the old lamp. Any profits derived from large sales also ultimately go to the public.

(21) Returns Yielded on Investments in Farm Loans.

Under date of March 20, 1917, the Division of Information of the Federal Farm Loan Board of the United States Treasury Department issued the following statement:

Treasury Department, Federal Farm Loan Board.

Washington, D. C., March 20, 1917.

To Washington Correspondents,
Farm Papers, and Editorial Writers:

The announcement given to the Press Association Monday, March 19th, merely stated that the interest rate under the Farm Loan Act had been fixed at 5 per cent and that the interest rate on Farm Loan Bonds would be $4\frac{1}{2}$. It also said that on a total of four billion dollars worth of farm mortgages now existing in the United States this would mean a reduction in the interest rate of from 7.4 per cent now, to 5 per cent under the Federal Farm Loan regime.

For the purpose of enabling you to make more specific local application of this new condition, I am sending you herewith a table showing the present volume of farm mortgage indebtedness in each state and the present average rate of interest. This will enable you to compute the annual saving to the farmers of your own state as a result of the application of the Federal Farm Loan Act. This saving, however, takes no account of the greatly increased volume of business which will result by reason of the reduced interest rate.

Please bear in mind that under the Farm Loan Act a flat rate of 5 per cent will prevail in every state in the Union, and that farmers are permitted, under this act, to borrow money or refund existing indebtedness, to buy land, to invest in livestock to put on the mortgaged land, or to erect buildings, fencing, construct drainage, buy needed machinery or anything which will add to the value of the land or facilitate its cultivation.

Very truly yours,

FEDERAL FARM LOAN BUREAU,
By FRANK R. WILSON,
Division of Information.

State.	Present volume of farm loans.	Present interest rate.
1396 Maine	\$13,727,000	6.2%
New Hampshire	6,100,000	5.3%
Vermont	17,113,000	5.6%
Massachusetts	24,000,000	5.6%
Rhode Island	2,514,000	5.9%
Connecticut	17,013,000	5.7%
New York	168,234,000	5.6%
New Jersey	35,610,000	5.8%
Pennsylvania	109,312,000	5.8%
Ohio	130,678,000	6.1%
Indiana	132,325,000	6.2%
Illinois	355,802,000	6.0%
Michigan	118,950,000	6.6%
Wisconsin	206,681,000	5.8%
Minnesota	145,181,000	6.8%
Iowa	469,063,000	5.9%
Missouri	223,107,000	6.8%
North Dakota	100,364,000	8.7%
South Dakota	92,467,000	8.0%
Nebraska	165,015,000	7.1%
Kansas	180,706,000	6.9%
Delaware	6,857,000	5.6%
Maryland	32,393,000	6.1%
Virginia	25,007,000	6.8%
West Virginia	9,725,000	6.4%
North Carolina	21,005,000	7.7%
South Carolina	24,967,000	8.4%
Georgia	29,711,000	8.7%
Florida	4,490,000	9.6%
Kentucky	41,305,000	7.1%
Tennessee	25,468,000	7.9%
Alabama	25,943,000	9.4%
Mississippi	34,419,000	8.5%
Arkansas	21,023,000	9.6%
Louisiana	21,141,000	8.6%
Oklahoma	73,129,000	8.4%
Texas	184,321,000	9.0%
Montana	17,111,000	10.0%
Idaho	21,566,000	8.9%
Wyoming	7,148,000	10.0%
Colorado	36,767,000	8.9%
New Mexico	4,585,000	10.5%
Arizona	4,161,000	9.4%
Utah	6,818,000	9.0%
Washington	43,470,000	8.7%
Oregon	35,535,000	8.0%
California	124,752,000	7.6%

It will be observed from the foregoing that the volume of farm loans outstanding in the State of California was \$124,752,000 upon which the borrowers paid an average rate of 7.6%, which under the present law is net to the lender as the mortgages are not subject to State or local taxation.

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(22) Profits in Banking.

In the annual report of the Comptroller of the Currency to the Congress of the United States covering respectively the fiscal years ended June 30, 1913, June 30, 1914 and June 30, 1915, there appears in the reports of each of these years a section with the caption "Earnings and Dividends of National Banks," which sections I quote in full:

Fiscal year ended June 30, 1913, (page- 20 and 21 of Comptroller's report) :

"To the shareholders of national banks from a dividend standpoint the year ended June 30, 1913, was quite satisfactory, as from net earnings totaling \$160,980,084, dividends were paid to the amount of \$119,906,050, or at the rate of 11.4 per cent, as against an average of 11.01 per cent for the prior five years, and only twenty-six hundredths of 1 per cent less than the average for 1912. The net earnings exceeded those for 1912 by \$11,923,481, although the amount of dividends paid was less by \$394,822. Dividends based on capital and surplus averaged 6.75 per cent for the year, while the net earnings to capital and surplus were 9.06 per cent.

On capital of \$1,051,720,675 and on capital and surplus combined of \$1,776,992,857, the banks' gross earnings were \$499,252,336, against which losses and premiums were written off to the amount of \$53,756,372, together with expenses and taxes of \$284,515,880. Upon comparison with corresponding returns for 1912 it is seen that the gross earnings, based on capital and surplus, have increased a fraction in excess of 2 per cent, and the net earnings approximately one-half of one per cent.

In the accompanying table will be found data relating to the amount and per cent of dividends paid by national banks in each geographical division, together with the amount of capital and surplus of banks reporting their earnings, and the relative proportions of surplus to capital. As will be noted, the highest dividend rate (15.08 per cent) was paid by the banks in the western division and that the lowest, exclusive of Hawaii was paid by banks in the New England States, viz., 8.61 per cent. The surplus of the banks approximated 70 per cent of their capital, ranging in continental divisions from the minimum of 47.77 per cent in the western division to the maximum of 103.61 per cent in the eastern.

Capital, Surplus, Amount, and Per Cent of Dividends Paid by National Banks in Each Geographical Division for the Year Ended June 1913.

Divisions.	Number of banks.	Capital stock.	Surplus.	Per cent of surplus to capital.	Amount of dividends paid.	Per cent of dividends to capital.
New England States.....	453	\$101,436,700	\$63,282,552	62.39	\$8,730,919	8.61
Eastern States.....	1,050	338,349,675	350,561,370	103.61	41,135,784	12.16
Southern States.....	1,486	171,029,900	89,683,676	52.44	19,172,007	11.21
Middle Western States.....	2,048	281,753,100	145,424,562	51.61	29,647,178	10.52
Western States.....	1,259	71,582,500	34,195,228	47.77	10,793,546	15.08
Pacific States.....	504	86,958,800	41,859,372	48.14	10,381,416	11.94
Hawaii	4	610,000	265,422	43.51	45,200	7.41
Total	7,404	\$1,051,720,675	\$725,272,182	68.96	\$119,906,050	11.43

Following the abstracts of reports of earnings and dividends of national banks for the current year, appearing in the appendix is a condensed statement relating to the capital, surplus and earnings and dividends for each year from 1869 to 1913, inclusive, together with the amount of aggregate earnings and dividends for the 44 years, from which will be noted that upon the average capital 1398 and surplus of \$633,132,322 and \$265,033,657, respectively, the annual earnings averaged \$76,664,139 and dividends \$58,568,695. The percentage of earnings to capital and surplus was 8.65, dividends 6.52, and dividends to capital alone, 9.25. The entire net earnings as reported were \$3,417,222,128 and the dividends \$2,577,022,602, the latter amount being equivalent to 245 per cent of the capital as reported on June 30, 1913."

Fiscal year ended June 30, 1914 (page 49 of Comptroller's report) :

"The net earnings of national banks reporting their earnings and dividends for the year ended June 30, 1914, aggregated \$149,270,170, from which dividends were paid to the amount of \$120,947,096, the average dividend rate being 11.37 per cent against an average rate of 11 per cent for the five years previous. Dividends based upon capital and surplus averaged 6.80 per cent for the year, while the net earnings to capital and surplus were 8.39 per cent.

The gross earnings of the banks aggregated \$515,624,301, against which losses and premiums were written off to the amount of \$64,929,614, together with expenses and taxes of \$301,424,516. The combined capital and surplus of the banks aggregated \$1,778,095,306, the percentage of surplus (\$714,117,131) to capital being 67.11 per cent.

In the appendix of this report will be found the returns from the banks in each reserve city and state relating to their earnings and dividends during the year ended June 30, 1914, together with like data covering the years ended March 1, 1870, to June 30, 1914, and there is submitted herewith a table relating to the dividends paid by the banks located in each geographical division of the country.

Capital, Surplus, Amount, and Per Cent of Dividends Paid by National Banks in Each Geographical Division for the Year Ended June 30, 1914.

Divisions.	Number of banks.	Capital stock.	Surplus.	Per cent of surplus to capital.	Amount of dividends paid.	Per cent of dividends to capital.
New England States.....	445	\$100,936,700	\$62,936,425.00	62.35	\$8,113,911.71	8.04
Eastern States.....	1,645	338,244,175	329,014,444.80	97.27	43,864,876.00	12.97
Southern States.....	1,508	175,450,900	91,812,176.52	52.33	18,551,004.01	10.57
Middle Western States.....	2,061	284,305,100	154,312,535.35	54.28	29,081,320.70	10.23
Western States.....	1,268	72,287,500	34,639,853.38	47.69	10,082,328.08	13.95
Pacific States.....	521	92,118,800	41,726,191.65	45.30	11,208,455.73	12.17
Hawaii	5	635,000	275,444.70	43.38	45,200.00	7.12
Total	7,453	\$1,063,978,175	\$714,117,131.40	67.12	\$120,947,096.23	11.37

Fiscal year ended June 30, 1915 (page 68 of Comptroller's report, Vol. 1) :

"The reports of earnings and dividends of national banks for the fiscal year ended June 30, 1915, show that the gross earnings of the banks were \$527,985,252, as against \$515,624,301 for the year ended June 30, 1914. It appears, however, that the net earnings of the banks for the current year are but \$127,052,974 as against \$149,270,-170 for 1914 and that the dividends paid during the current year were but \$113,639,415 as against \$121,147,096 in 1914. The average dividend rate was reduced from 11.39 per cent in 1914 to 10.63 per cent in 1915. It is also noted that the average dividend rate for the past five years was 11.36 per cent. For the current year dividends based upon combined capital and surplus averaged 6.33 per cent, while the net earnings to capital and surplus were 7.08 per cent. The combined capital and surplus of the banks for 1915 aggregated \$1,795,197,283, the percentage of surplus to capital being 68.03 per cent.

1399 In volume 2 of this report will be found the returns for the year ended June 30, 1915, from the banks in each reserve city and State relating to their earnings and dividends, and also corresponding data for each year from March, 1870, to June 30, 1915.

In the accompanying statement is shown the number of banks, their capital, surplus, dividends paid, the percentage of surplus to capital, and the percentage of dividends to capital for each geographical division.

Divisions.	Number of banks.	Capital stock.	Surplus.	Per cent of surplus to capital.	Amount of dividends paid.	Per cent of dividends to capital.
New England States.....	439	\$98,141,700.00	\$62,032,335.00	63.21	\$8,473,253.75	8.63
Eastern States.....	1,046	331,792,175.00	335,279,692.33	101.05	39,288,003.43	11.84
Southern States.....	1,566	180,711,205.94	95,231,730.10	52.70	17,297,379.43	9.57
Middle Western States.....	2,083	294,710,700.00	156,544,894.73	53.12	29,598,491.71	10.04
Western States.....	1,293	73,357,500.00	35,154,255.63	47.92	9,722,354.64	13.25
Pacific States	528	89,228,800.00	42,090,855.72	47.17	9,213,697.50	10.33
Hawaii	5	635,000.00	286,438.81	45.11	46,325.00	7.30
Total	7,560	\$1,068,577,080.94	\$726,620,202.32	68.00	\$113,639,415.46	10.63

On page 70 of the report of the Comptroller of the Currency covering the fiscal year ended June 30, 1915, appears a table showing that of the 10,796 banks chartered during the existence of the national banking system, a period of 52 years dating from 1863 to 1915 inclusive, with an aggregate capital of \$1,115,735,982, not more than 566, with an aggregate capital of \$93,735,920, were closed because of insolvency, being an average of less than eleven banks per year; and of the 566 so closed, 34 banks were afterwards restored to solvency. It may be calculated from the figures contained in this table that of the total capital of all the banks organized during the existence of the national banking system, less than 0.84% was subsequently involved in the insolvency of the 566 banks closed for that reason.

On page 280 of Vol. 2 of the Report of the Comptroller of the Currency covering the fiscal year ended June 30, 1915, Table No. 60 shows the "Number of national banks, their capital, surplus, dividends, net earnings, and ratios, yearly, 1870 to 1915," from which it appears that in the 46 years covered by the table "Dividends to capital" have averaged 9.38%; "Dividends to capital and surplus" have averaged 6.52%; and "Net earnings to capital and surplus" have averaged 8.57%. A section of this table covering the period from 1900 to 1915 is reproduced below:

1400	Year ended March 1—	No. of banks.	Capital.	Surplus.	Dividends.	Net earnings.	Ratios.		
							(a)	(b)	(c)
1900	3,571	\$603,396,550	\$250,543,068	\$47,433,357	\$69,981,810	7.9	5.0	8.2
1901	3,765	622,366,064	257,948,290	50,219,115	87,074,175	8.1	5.7	10.0
1902	4,131	659,608,169	285,623,449	64,892,442	99,103,168	9.8	6.8	10.5
1903	4,451	688,817,825	324,402,477	60,123,622	102,743,721	8.7	5.9	10.1
1904	4,914	746,365,438	372,551,716	73,640,123	116,475,135	9.9	6.6	10.4
1905	5,356	768,114,231	402,350,890	70,996,322	105,196,154	9.2	6.1	9.0
1906	5,685	779,544,247	414,790,562	80,831,561	113,062,529	10.4	6.8	9.5
1907*	6,017	837,092,528	501,774,453	144,376,245	219,195,804	17.2	10.8	16.4
1908	6,562	901,384,244	552,563,178	98,149,236	132,254,329	10.89	6.75	9.10
1909	6,788	919,142,825	585,407,483	92,963,450	131,185,750	10.12	6.18	8.72
1910	6,984	963,457,549	630,159,719	105,898,622	154,167,489	10.99	6.65	9.67
1911	7,163	1,008,180,225	699,931,760	114,685,412	156,985,513	11.38	6.83	9.35
1912	7,307	1,031,383,425	704,346,766	120,300,872	149,056,093	11.66	6.93	8.59
1913	7,404	1,051,720,675	725,272,182	119,900,051	160,980,084	11.40	6.75	9.06
1914	7,453	1,063,978,175	714,117,131	120,947,096	149,270,171	11.37	6.80	8.39
1915	7,560	1,068,577,080	726,629,292	113,639,415	127,052,973	10.63	6.33	7.08
Average, 46 years,.....			\$651,964,726	\$284,830,831	\$61,121,937	\$80,294,462	9.38	6.52	8.57

*March 1, 1906, to July 1, 1907; thereafter years ended July 1.

(a) Dividends to capital.

(b) Dividends to capital and surplus.

(c) Net earnings to capital and surplus.

Attention is directed to the following facts appearing in the above tables with respect to the Pacific States, which subdivision embraces the State of California:

Period.	Amount of dividends paid.	Per cent of dividends to capital.
Year ended June 30, 1913.....	\$10,381,416	11.94
Year ended June 30, 1914.....	11,208,455	12.17
Year ended June 30, 1915.....	9,213,607	10.33

1401

(23) Conclusion.

The actual cost to this Company of borrowed and guaranteed capital is simply a question of facts which have already been stated in Section 9. It has also been pointed out that the entire needs of the Company for capital cannot be met from these sources and that a substantial proportion of this new capital must come from investors whose returns are not guaranteed but who, as a matter of fact, must assume the position of guarantors and accept all of the risks of the business. What these risks are has already been pointed out in a necessarily incomplete way. It has also been pointed out in Section 13, what margin of safety in earnings the money market demands when it furnishes new capital through the medium of preferred stock. In Section 14 a statement has been made as to what margin of safety is in my judgment necessary to attract the capital that assumes the ultimate risk. Section 14 was written more for the purpose of providing a formula to aid the judgment. This formula may be reduced to mathematical terms, but whatever solution is thus arrived at must be weighed in the light of experience. If we assume the condition that the Company can obtain its needed capital in the ratio of 60% from bonds, 20% from preferred stock and 20% from common stock I believe this part of the problem has been stated about as favorably as it can be with respect to its bearing upon the cost of money. In the Company's present situation it represents rather an ideal condition. If we also put the problem on the basis of obtaining \$100.00 it will simplify the presentation and work out as follows, the actual rates paid for money obtained from bonds and preferred stock as shown in table on Page 14 being used:

\$60.00 bond money.....	@ 6.20%	equals \$3.72
20.00 preferred stock money.....	@ 7.40%	equals 1.48
Total		\$5.20
40% margin of safety for preferred stock (see Section 13) ..		\$2.08
20% common stock money at 8%		1.60
Total		\$8.88

This calculation shows that after paying \$5.20 for bond and preferred stock money there is left \$3.68 for the common stock dividend

of \$1.60, and a final balance after the common stock dividend of \$2.08.

Working out the foregoing on the basis of Section 14 "Margin of Safety for Common Stock" we have the following problem in proportion:

\$1.48 is to \$2.08 as \$1.60 is to \$2.25.

It will be noted that the margin of safety for common stock of \$2.08 in the first example compares with \$2.25 in the preceding calculation. If this \$2.25 be assumed to be the margin of safety for common stock that is necessary, the rate of return would work out as follows:

Required to be earned on bond money.....	\$3.72	
Required to be earned on preferred stock money..	1.48	
Required to be earned on common stock money..	1.60	
Required to be earned as margin of safety for common stock.....	2.25	
Total	\$9.05	or 9.05%

1402 It is my judgment that this Company could obtain par for its common stock on the basis of paying 8% dividends with a margin of safety equivalent to these dividends; that is, if it were in a position to pursue the policy of "A dollar for dividends and a dollar for surplus." I also believe that under these conditions it could obtain money from bonds on a 6% basis and money from preferred stock on a 7% basis. This would require the following rate of return:

\$60.00 bond money.....	@ 6%	\$3.60
20.00 preferred stock money.....	@ 7%	1.40
20.00 common stock money.....	@ 8%	1.60
Margin of safety for common stock.....		1.60
Total		\$8.20

I hope the interpolation of these calculations has not diminished the emphasis I desire to lay upon the fact that they are based on rather ideal conditions, which at present are not realizable, and that judgment based upon experience must give the final answer. In view of the conditions herein set forth and of the opportunities afforded for investment of capital in other enterprises, I am of the opinion that during the period from July 1st, 1913, to June 30th, 1916, capital in sufficient volume could not have been induced to embark in the gas business in San Francisco without the reasonable assurance of an average annual rate of return of 8½% of the entire capital invested, unless opportunities had been present for speculative profit sufficient to make up for any deficiency below this rate of return. In my judgment the gas business in San Francisco did not, during this period, offer such speculative opportunities.

1403 Mr. HOCKENBEAMER, having read his prepared statement, testified further on direct examination substantially as follows:

The exchange of the Pacific Gas and Electric Company's original preferred for its first preferred stock took place between July 1st, 1916, and December 31, 1916, with the exception of a small amount that has been exchanged since. About 1% has not been exchanged. \$31,696,866.66 par value of the Pacific Gas and Electric Company's common stock is owned by the San Francisco Gas and Electric Company. The difference between that amount and \$65,964,142.00 would leave the amount that has not been issued. The Pacific Gas and Electric Company owns more than 99% of the stock of the San Francisco Gas & Electric Company.

In my prepared statement, under the heading "New Capital," I presented a table of bonds of industrial companies, with quotations approximately as of the present time, and I promised Mr. Searls I would give him the quotations on those bonds prior to the war, as some of these industries have had their profits very largely increased by reason of the war. I have referred to the Financial and Commercial Chronicle and obtained the prices at January 31, 1913; that was before the European war started and also before the foreign purchases had any influence on the earnings of the different
1404 companies. The following table shows in parallel columns the quotations used in my statement and the quotations in January, 1913:

Name of issue.	Price used in statement.	Price in Jan., 1913.
Amer. Agricultural Chemical Co.....	100	101
Amer. Smelting & Refining Co.....	91 $\frac{1}{8}$	unobtainable.
Amer. Tobacco Co.....	119	120
Baldwin Locomotive Works.....	101 $\frac{1}{2}$	102 $\frac{1}{2}$
Central Leather Company 20-year...	98	98 $\frac{3}{8}$
Corn Products Refining Co.....	97 $\frac{1}{4}$	95
National Enamel & Stamping Co...	99 $\frac{1}{2}$	94 $\frac{1}{2}$
Union Bag and Paper Co.....	82 $\frac{3}{4}$	86 asked, no bids.
Western Electric Co.....	98 $\frac{3}{4}$	98 $\frac{3}{4}$
Bethlehem Steel Co.....	99 $\frac{7}{8}$	101 $\frac{1}{2}$
Indiana Steel Co.....	100 $\frac{1}{2}$	101 $\frac{1}{2}$
United States Steel Corp. Coupon...	101 $\frac{1}{2}$	102 $\frac{5}{8}$

On cross-examination the witness testified in substance as follows:

My study was directed to showing first, the rate of return which in my judgment it would have been necessary for the Pacific Gas & Electric Company to have paid to get the money that it must necessarily expend in discharging its public duty. The Company must earn a margin over and above the cost of money and, if it had not done so, it could not have got the money which it did get on General and Refunding Mortgage Bonds at the rate shown. If you

owned the gas properties in San Francisco and offered to sell them to me, I would not buy those properties, even as a going concern, unless I had reasonable assurance that I could derive earnings from them equal, on the average, to $8\frac{1}{2}\%$ of the amount paid.

1405 I have not the data showing the amount of capital which the Pacific Gas and Electric Company had to raise during each of these years in question, in order to conduct its operations in the San Francisco gas department alone.

The cost of additions and betterments would not be a measure of the company's annual requirements for new capital. Sinking fund payments must be made annually; and from time to time bond issues have to be refunded or paid.

Under our practice, the amounts of money representing reserves for accruing depreciation or obsolescence are not kept as separate funds, but are reinvested in the property and represented in the assets. The depreciation fund is not represented in our assets by cash; it is simply represented in the total assets; it may be partly in materials and supplies, partly in plant and partly in cash. Of course, the cash appropriated to the depreciation reserve comes into the company's treasury from the consumers. The excess over and above the amount required for replacements will be available for the company's requirements the same as any other assets. The amount of cash that the company would have to go into the market for by way of new capital would not be diminished by the amount made available from the depreciation reserve. We cannot afford to allow our working assets to be depleted and diminished by paying out of them the entire cost of additions and betterments. We

1406 only do that for a while until the money market conditions are such that we can sell securities and reimburse our treasury. Depreciation may render extensive replacements necessary at irregular intervals and we have to be prepared to take care of them. If the depreciation fund has been used to pay for additions and betterments, new capital must be procured to reimburse the depreciation fund when it is needed. The Pacific Gas and Electric Company carries in its books a general depreciation reserve for its entire system, and that reserve is available for replacements wherever they may be needed.

Our records are kept in sufficient detail so that we know just what depreciation charges are made from year to year in every department. I do not believe that we make any apportionment of the general reserve among the various departments which would show whether or not there is an excess of reserves over the charges in any department.

The amount of money which the Pacific Gas and Electric Company needed during the years in question for capital purposes may have affected the rate of interest which it was compelled to pay. A company may have to pay a higher rate to obtain a small amount of new money than it would have to pay for a much larger amount. The expense incident to the issuance and sale of a new bond issue of a comparatively small amount is frequently much greater in proportion

1407 to the amount of money obtained than the expense incurred in the issuance and sale of a larger amount. This is not always the case because sometimes a company issuing a small amount of bonds may dispose of them to people who are interested in the company and therefore may not find it necessary to dispose of them through the agency of investment bankers. In my prepared statement, under the heading "Cost of Capital to Pacific Gas and Electric Company," I have shown separately the cost of obtaining money by the issuance of General and Refunding Mortgage Bonds preferred stock and gold notes. I cannot, without making the necessary computations, state the average cost of money obtained by the issuance of all of those securities. But it is obvious from an inspection of the table contained in my statement under the heading just mentioned that the average cost of all of the money so obtained was less than $8\frac{1}{2}\%$. But the point which I made is that the company could not have obtained the money which it did obtain through the issuance of those securities if it had not had a margin of safety in its earnings. If the company had only earned the amount required for paying interest on its bonds and dividends on its preferred stock, it could not have obtained the money which it did in fact obtain. It is my opinion that the company requires a rate of return upon its capital larger than the average cost of the money shown in the aforesaid table.

1408 I think that the retirement of bonds through the operation of sinking funds is a capital operation and that the money required for sinking fund payments should be obtained from the sale of junior securities.

The amount of new capital which the Pacific Gas and Electric Company has required in its gas department is very much less than the amount required in its electric department. During the years 1913 and 1914 the company needed and obtained a large amount of new money for the development of its hydro-electric properties.

The maximum amount of the Pacific Gas and Electric Company's gold notes outstanding at any one time would not exceed \$7,000,000.00. During that period of time small companies as well as big ones experienced difficulty in obtaining new money for capital expenditures. A small company might have had more difficulty in raising half a million dollars than the Pacific Gas and Electric Company had in raising seven million dollars.

1409 Mr. W. D. O'BRIEN, a witness called for the defendants, testified in substance as follows:

I am 37 years of age, reside in Piedmont, California, and am engaged in the automobile business.

I was in the bond and mortgage business for about ten years, principally in business for myself with offices in the First National Bank Building. I was also Sales Manager for the Western Mortgage & Guaranty Company and Sales Manager for the Agricultural Credit Corporation of California.

During the time I was in that line of business I had occasion to make loans of money in San Francisco in large amounts and I am

personally familiar with many of the large loans which have been made on real estate in San Francisco in the last five or six years.

At the request of Mr. Searls, I have made a compilation of all the large loans of money which have been made on real estate security in San Francisco, concerning which I could find authentic data. The data used were taken from the records at the Recorder's office in the City Hall and from the office of the State Bank Examiner in San Francisco.

The witness here produced a written statement and testified that the figures shown in it were correctly transcribed from the sources which he had just named. This statement was admitted in evidence and marked "Defendants' Exhibit 100." A true copy of the first page of said Exhibit No. 100 is as follows:

Table showing individual deposits in San Francisco savings banks drawing 3% to 4% interest.

Year.	
June 30, '10.....	\$159,863,419.30
June 7, '11.....	164,938,581.90
Feb. 9, '12.....	174,032,199.53
June 4, '13.....	185,233,054.95
June 30, '14.....	199,617,131.90
June 23, '15.....	205,858,110.85
June 30, '16.....	232,440,284.64

Table showing real-estate mortgage loans in San Francisco savings bank.

\$97,238,876.28
102,798,267.24
112,127,293.70
122,123,359.56
131,306,838.31
136,166,725.08
142,357,973.01

The remaining four pages contain a list of large loans made on the security of real estate mortgages and deeds of trust in San Francisco between October 1, 1907, and December 31, 1916. The dates and amounts of these loans and the interest rates specified in the mortgages are shown in the following table, viz:

Date. Borrowed from—

1907.

Oct. 1. Hibernia Sav. & Loan Society.....

Oct. 26. Equitable Life Insurance Soc.....

1908.

July Mercantile Trust Co. Dr.....

Sept. 1. Levison Est.....

Sept. Hibernia Sav. & Loan Society.....

Table showing the total number and amounts of mortgages and deeds of trust recorded on San Francisco real estate from 1910 to 1916 and rates of interest.

No. of loans.	Amount.	Rate of interest of banks.
5,410	42,937,541	5% few at 6%
5,362	36,638,482	5½% " " 6%
5,783	42,291,845	5½% " " 6%
5,040	30,409,978	5½% to 6%
5,423	39,598,370	5½% to 6%
5,243	33,885,732	5% to 6%
6,200	43,981,962	5% to 6%

Amount of loan. Rate of interest.

100,000	{ 7% Gross 5% Net
2,000,000	{ 5½% after finished 6% during construction

500,000 5%

272,500 4¾% 1st year—4½% 4 Yr.

185,000 { 7% Gross
5½% Net (about)

Date.	Borrowed from—	Amount of loan.	Rate of interest.
1411			
Oct.	Hibernia Sav. & Loan Society.....	91,000	5½ %
Oct.	Mutual Life Ins. Co.....	500,000	5½ %
Nov.	New York Life Ins. Co.....	1,300,000	5½ %
1909.			
Dec.-1908	.....	90,000	
"	Pacific Mutual Life Ins. Co.....	185,000	5½ %
		275,000	
May	12. Mary E. Callahan.....	81,500	5 %
May	Estate of A. C. Whitcomb.....	125,000	5½ %
May	Hibernia Sav. & Loan Society.....	83,000	5½ %
May	" " ".....	97,000	5½ %
June	New York Life Ins. Co.....	1,200,000	5 %
Sept.	3. Pacific Mutual Life Ins. Co.....	85,000	5½ %
Sept.	Hibernia Sav. & Loan Society.....	190,700	5½ %
Sept.	" " ".....	500,000	5½ %
Sept.	Pacific Mutual Life Ins. Co.....	200,000	5½ %
Oct.	4. New York Life Ins. Co.....	550,000	5 %
Nov.	Hibernia Sav. & Loan Society.....	150,000	5½ %
Nov.	Geo. W. Hooper.....	150,000	5½ %
Nov.	S. M. & Chas. R. Rosenbaum.....	130,000	4½ %
			10 Yrs.
1910.			
Feb.	15. Hibernia Sav. & Loan Society.....	139,800	5½ %
Feb.	28. Cogswell Polytechnical College.....	300,000	Gross { 6½ % Net 10 Years { 4½ %

March 8.	"	"	300,000	{ 6½ % Gross 4½ % Net 10 Years
1412					
March 31.	Cogswell Polytechnical College.	.....	140,000	{ 7 % Gross 5 % Net 3 Yrs.
March 31.	"	"	200,000	{ 7 % Gross 5 % Net 5 Yrs.	
March 31.	Hibernia Sav. & Loan Society.	.....	284,000	5½ %
Apr.	Union Trust Co.	.....	175,000	5 %—5 Yrs.
1911.					
Jan.	Northwestern Mutual Life Ins. Co.	.....	175,000	5 %
Oct.	New York Life Ins. Co.	.....	1,000,000	5 %—10 1/20 Yrs.
Aug.	Hibernia Sav. & Loan Society.	.....	50,095	5½ %
Oct. 30.	"	"	100,000	5½ %	
Oct. 24.	"	"	120,000	5½ %	
Oct. 6.	"	"	96,000	5½ %	
Oct. 13.	"	"	406,300	5½ %	
Oct. 20.	"	"	100,330	5½ %	
Nov. 13.	Leland Stanford Jr. Univ.	.....	150,000	5½ %
Nov.	Hibernia Savings & Loan Soc.	.....	119,250	5½ %
Dec.	"	"	320,000	5½ %	
1912.					
Jan.	Hibernia Sav. & Loan Society.	.....	80,000	5½ %
Jan.	"	"	150,000	5½ %	
Jan.	"	"	120,000	5½ %	
Feb.	Equitable Life Assn. Soc.	.....	2,000,000	5½ %
Feb.	Hibernia Sav. & Loan Society.	.....	300,000	5½ %

1414

Nov.

Northwestern Mutual Life Ins. Co.	850,000	5%
Hibernia Sav. & Loan Soc.	150,000	5½%
Emile A. Lyman	100,000	5%
Hibernia Sav. & Loan Society	190,000	6%
" "	100,000	6%
" " "	100,000	6%
" " "	100,000	6%
" " "	100,000	6%
" " "	685,000	6%

1914.

Jan.	Hibernia Sav. & Loan Society	673,600	5%
Jan.	21. Equitable Life Ins. Ass.	256,000	5½%
Feb.	2. Hibernia Sav. & Loan Society	100,000	5%
	Chas. G. Lathrop	100,000	5½%
Apr.	Northwestern Mutual Life Ins. Co.	800,000	5%
June	2. New York Life Ins. Co.	1,000,000	5%
	Daniel Meyer & Co.	175,000	5%
	Hibernia Sav. & Loan Society	485,000	6%
	" " "	150,000	6%
	" " "	350,000	6%
	C. A. Hooper & Co.	150,000	7%
	Hibernia Sav. & Loan Society	109,000	6%
	" " "	350,000	6%
	Security Sav. Bank	146,000	6%
	Hibernia Sav. & Loan Society	196,750	6%
1415	H. Samson	210,000	6%
	Hibernia Sav. & Loan Society	110,000	6%

In the foregoing table, "gross" interest rates are those which were stipulated to be paid by the borrower when the lender paid the taxes levied on the obligations secured by mortgage; and "net" interest rates are those which were payable when the borrower paid the taxes on such obligations. The tax rate in San Francisco during this period was approximately two per cent. All interest rates given are net unless otherwise specified.

If brokerage was charged on any of these mortgages, it was not reflected in the interest figures shown in Exhibit No. 100. The usual brokerage charged for procuring large loans was not over 1% of the amount borrowed.

On cross-examination, the witness testified in substance as follows:

In general, the loans listed in Exhibit No. 100 would not exceed 50% of the value of the property; in some instances they may have been as much as 60% and in others less than 50%. Most of 1418 the large loans listed in Exhibit No. 100 were made on mortgages of income producing property in the business section of San Francisco.

Generally speaking, the values of properties in centrally located business districts are more stable than they are in the outskirts of the city.

Mr. WILLIAM A. BOSTON, a witness called for the defendant, testified in substance as follows:

I reside in San Francisco, am 60 years of age, and am a public accountant. I have been a public accountant for about 5 years. Prior to that I was with Smith, Tevis & Hanford, Inc., in the bond and investment business for more than two years until they went out of business. Before that I was in the Savings and Loan Bank as an accountant, and then as cashier, until the bank was absorbed by the Savings Union Bank & Trust Company. While in the business mentioned, I became familiar with the stock and bond market in San Francisco.

Smith, Tevis & Hanford, Inc., handled a good many million dollars' worth of bonds, including bonds of public utilities, and I became familiar with the method of figuring the cost and return on securities.

In the Spring Valley case, I made a study of the prices at which securities had been sold on the San Francisco Stock and Bond 1419 Exchange. I have continued that study with a view to determining the average market rates of interest paid on bonds and securities bought and sold on the San Francisco Stock and Bond Exchange. The figures in this study, except those which relate to municipal bond sales, were taken from the official reports of the San Francisco stock and Bond Exchange, extending over a period from 1907 to June 30, 1916, and I know that they are correct. The data with reference to municipal bond sales I obtained from Mr. H. A. Mason, bond clerk of the Board of Supervisors of San Francisco.

The study or statement concerning which Mr. Boston testified as aforesaid was thereupon admitted in evidence and market defendants' Exhibit No. 101. A true copy of pages numbered 1 to 5, containing tables or summaries, and pages numbered 6, 20 to 34, and 41 to 46, inclusive, containing the details used in the preparation of the tables on pages numbered 1 to 5 of said Exhibit No. 101, is as follows:

1420

EXHIBIT 101, P. 1.

TABLE I.

Average Net Return on Bonds and Stocks Listed and Sold on San Francisco Stock and Bond Exchange and on Municipal Bonds Issued and Sold by the City and County of San Francisco for the Period 1907 to 1915, Both Inclusive, and for the Six Months Ending June 30, 1916.

	Sales, par value.	Basis.	Average net rate.
Bonds sold on San Francisco Stock and Bond Exchange..	81,225,500	4,138,129.45	5.09
Bonds, Municipal, sold by City of San Francisco and on San Francisco Stock and Bond Exchange.....	41,547,000	1,910,660.70	4.59
Stocks sold on San Francisco Stock and Bond Exchange..	65,433,050	3,614,790.24	5.52
Totals	188,205,550	9,663,580.39	5.13

Average Net Rate =
Basis $9,663,580.39 \div 188,205,550$ Par Value of Sales = 5.13% Net Rate.

EXHIBIT 101.—Continued.

TABLE II.

Average Net Return on Bonds and Stocks Listed and Sold on San Francisco Stock and Bond Exchange and on Municipal Bonds Issued and Sold by the City and County of San Francisco for the Period 1913 to 1915, Both Inclusive, and the Six Months Ending June 30, 1916.

	Sales, par value.	Basis.	Average net rate.
Bonds sold on San Francisco Stock and Bond Exchange..	30,029,000	1,576,720.95	5.25
Bonds, Municipal, sold by City of San Francisco and on San Francisco Stock and Bond Exchange.....	19,715,000	956,765.90	4.85
Stocks sold on San Francisco Stock and Bond Exchange..	35,491,700	2,169,178.12	6.11
Totals	85,235,700	4,702,614.97	5.52

Average Net Rate =
 Basis 4,702,614.97 ÷ 85,235,700 Par Value Sales = 5.52% Net Rate.

TABLE III.

Average Net Return on Bonds Listed and Sold on and Francisco Stock and Bond Exchange for Years 1907 to 1915, Both Inclusive, and the Six Months Ending June 30, 1916.

Summary.

Year	Period.	Sales, par value.	Basis.	Average net rate.
1907	3,753,000	173,545.50	4.62
1908	5,503,000	291,900.20	5.30
1909	9,713,500	475,230.30	4.89
1910	7,580,000	373,736.40	4.93
1911	8,925,000	441,661.30	4.95
1912	15,722,000	805,334.80	5.12
1913	9,256,500	483,789.60	5.22
1914	5,974,000	316,823.00	5.30
1915	9,037,500	482,888.55	5.34
6 Months 1916	5,761,000	293,219.80	5.09
Totals	81,225,500	4,138,129.45	5.09

Average Net Rate =
 Basis $4,138,129.45 \div 81,225,500$ Par Value Sales = 5.09% Average Net Rate.

EXHIBIT 101.—Continued.

TABLE IV.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange for Years 1913 to 1915, Both Inclusive, and the Six Months Ending June 30, 1916.

Summary.

Year	Period.	Sales, par value.	Basis.	Average net rate.
1913.....		9,256,500	483,789.60	5.22
1914.....		5,974,000	316,823.00	5.30
1915.....		9,037,500	482,888.55	5.34
6 months 1916.....		5,761,000	293,219.80	5.09
Totals		30,029,000	1,576,720.95	5.25

Average Net Rate =
Basis 1,576,720.95 ÷ 30,029,000 Par Value Sales = 5.25% Average Net Rate.

1422

EXHIBIT 101, P. 3.

TABLE V.

Municipal Bond Sales by the City of San Francisco and on the San Francisco Stock and Bond Exchange for Years 1908 to 1915, Both Inclusive, and the Six Months Ending June 30, 1916.

Summary.

	Sales, par value.	Basis.	Average net rate.
Bonds sold by the City of San Francisco.....	41,223,000	1,895,885.70	4.60
Bonds sold on San Francisco Stock and Bond Exchange..	324,000	14,775.	4.56
Totals	41,547,000	1,910,660.70	4.59

EXHIBIT 101.—Continued.

TABLE VI.

Average Net Return on Municipal Bonds Sold by City of San Francisco and on San Francisco Stock and Bond Exchange for Years 1913 to 1915, Both Inclusive and the Six Months Ending June 30, 1916.

Bonds Sold by the City from Report by H. A. Mason, Bond Clerk, Board of Supervisors.

Period.	Sales, par value.	Basis.	Average net rate.
4½%			
Counter Sales during 1913 & 1914.....	4,699,000	211,455	4.50
5%			
January 27, 1914.....	264,000	13,028.40	4.935
June 29, 1914.....	660,000	31,449	4.765
June 29, 1914.....	840,000	41,538	4.945
November 27, 1914.....	308,000	15,323	4.975
Counter Sales Sept. 1914 to Jan. 1915.....	1,802,500	88,322.50	4.90
Counter Sales during 1913 & 1914.....	10,817,500	540,875	5
Bonds Sold on San Francisco Stock and Bond Exchange:			
January 1 to December 31, 1915.....	195,000	9,101	4.66
January 1 to June 30, 1916.....	129,000	5,674	4.40
Totals	19,715,000	956,765.90	4.85

Average Net Rate = $19,715,000 \div 19,715,000$ Par Value Sales = 4.85% Net Rate.
Basis 956,765.90

TABLE VII.

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange for Years 1907 to 1915, Both Inclusive, and the Six Months Ending June 30, 1916.

Summary.

Year	Period.	Sales, shares.	Basis.	Average net rate.
1907	16,373	83,316.54	5.08
1908	40,492	156,692.55	3.87
1909	62,993	365,294.51	5.80
1910	60,343	298,283.68	4.94
1911	62,333	288,636.00	4.63
1912	56,879.5	253,688.84	4.46
1913	78,436	494,960.03	6.31
1914	44,756	311,895.24	6.96
1915	140,242	806,168.66	4.74
6 months 1916	91,483	556,154.19	6.08
Totals	654,330.5	3,614,790.24	5.52

Net Rate of Return

Par Value of Stock = $654,330.5 \times 100 = 65,433,050$.

Basis $3,614,790.24 \div 65,433,050 = 5.52\%$ Net Rate.

EXHIBIT 101.—Continued.

TABLE VIII.

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange for Years 1913 to 1915, Both Inclusive, and for Six Months Ending June 30, 1916.

<i>Both Inclusive, and for Six Months Ending June 30, 1917</i>			
	Period.	Sales, shares.	Basis.
Year	1913.....	78,436	494,960.03
	1914.....	44,756	311,895.24
	1915.....	140,242	806,168.66
6 months	1916.....	91,483	556,154.19
	Totals.....	354,917	2,169,178.12
			<u>6.11</u>
			Average net rate.
			6.31
			6.96
			5.74
			6.08

Average Net Rate =
 Par Value of Stock = $354,917 \times 100 = 35,491,700$.
 Basis $2,169,178.12 \div 35,491,700 = 6.11\%$.

1424

EXHIBIT 101, P. 5.

TABLE IX.

Bond Sales, San Francisco Municipal.

San Francisco Stock and Bond Exchange.

Official Report—Monthly Sheet.

Bond Sales, San Francisco Municipal, for the Year 1915.

	Sales, par value.	Net interest rate.	Basis.
3½% :			
November, 1915	40,000	4.70	1,880
4½% :			
December, 1915	1,000	4.60	46
5% :			
February, 1915	5,000	4.75	237.50
March	66,000	4.75	3,135
June	30,000	4.70	1,410
July	3,000	4.75	142.50
December	50,000	4.50	2,250
	195,000		9,101

*Bond Sales, San Francisco Municipal, for Six Months Ending
June 30, 1916.*

4½% :			
March, 1916	3,000	4.35	130.50
5% :			
January, 1916	100,000	4.50	4,500
February	25,000	4	1,000
March	1,000	4.35	43.50
	129,000		5,674

Recapitulation.

January 1 to December 31/15..	195,000	....	9,101
January 1 to June 30/16	129,000	....	5,674
	324,000		14,775

Average net return = Basis 14,775 ÷ 324,000 sales = 4.56%.

1425

EXHIBIT 101, P. 6.

*Municipal Bonds Issued and Sold by City and County of San Francisco 1908 to 1914, Inclusive.**Showing Amounts Sold (Par Value), Net Interest, Rate (Yield), and Average Net Return.*

	Sales, par value.	Net interest rate.	Basis.
4½% :			
June 28, 1919.....	240,000	4.05	9,720.00
December 13, 1909.....	360,000	4.345	15,642.00
October 24, 1910.....	144,000	4.37	6,292.80
April 8, 1912.....	400,000	4.44	17,760.00
Counter Sales 1913-1914.....	4,699,000	4.50	211,455.00
5% :			
September, 1908.....	3,280,000	4.46	146,288.00
February 8, 1909.....	5,400,000	4.00	216,000.00
December 13, 1909.....	3,640,000	4.345	158,158.00
October 24, 1910.....	1,308,000	4.51	58,990.80
September 11, 1911.....	590,000	4.575	26,992.50
February 5, 1912.....	1,170,000	4.515	52,825.50
July 15, 1912.....	3,980,000	4.62	183,876.00
October 7, 1912.....	308,000	4.64	14,291.20
October 11, 1912.....	1,012,000	4.65	47,058.00
January 27, 1914.....	264,000	4.935	13,028.40
June 29, 1914.....	660,000	4.765	31,449.00
June 29, 1914.....	840,000	4.945	41,538.00
Nov. 27, 1914.....	308,000	4.975	15,323.00
Counter Sales, Sept. 1914 to Jan. 1, 1915.....	1,802,500	4.90	88,322.50
Counter Sales during 1913-1914	10,817,500	5.00	540,875.00
	<hr/> 41,223,000		<hr/> 1,895,885.70

Average net return = Basis 1,895,885.70 ÷ 41,223,000 Sales —
4.60% Net Rate H. A. Compiled and computed by Wm. A. Bos-
ton from data furnished by Mason, Bond Expert, Board of Supv.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet,—Year 1912.

	Interest rate.	Sales, par value.	Average interest rate.	Net interest rate.	Basis.
Associated Oil Co.	5	311,000	101.10	4.80	14,928.00
Bay Counties Power	5	101,000	101.47	4.88	4,928.80
Cal. Central Gas & Elec. Co.	5	27,000	102.51	4.80	1,269.00
Cal. Gas & Elec. Gen. Mtg.	5	287,000	102.08	4.84	13,890.80
California St. Cable Co.	5	138,000	102.40	4.13	5,699.40
Cal. Wine Association	5	336,000	96.23	5.40	18,144.50
Central Cal. Traction	5	97,000	95.20	5.35	5,189.50
City Electric Co.	5	179,000	89.13	5.82	10,517.80
Contra Costa Water Co.	5	106,000	97.69	5.88	6,232.80
Contra Costa Water Gen. Mtg.	5	33,000	94.80	7.00	2,310.00
Cal. Gas & Elec. Unifying	5	1,395,000	98.94	5.07	70,726.50
Edison Light & Power Co.	6	1,000	106.75	5.10	51.00
Edison Electric of L. A.	5	61,000	101.91	4.80	2,928.00
E. I. du Pont de Nemours	4½	1,000	85.00	5.65	56.50
First Federal Trust	5	5,000	100.50	4.97	248.50
Great Western Power Co.	5	2,533,000	87.43	5.85	148,180.50
Hawaiian Coml. & Sugar Co.	5	29,000	103.82	4.40	1,276.00
Honolulu R. T. & Land Co.	6	18,000	106.25	5.40	972.00
Los Angeles Electric Co.	5	13,000	100.77	4.90	637.00
Los Angeles Gas & Elec. Co.	5	84,000	99.90	5.05	4,242.00
Los Angeles Gas & Elec. Corp.	5	170,000	98.18	5.12	8,704.00
Los Angeles Railway Co.	5	163,000	107.26	4.50	7,335.00
Los Angeles Railway Corporation	5	132,000	97.62	5.16	6,812.20
Los Angeles Lighting Co.	5	20,000	100.00	5.00	1,000.00

EXHIBIT 101, P. 21.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1912.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Net Basis.
Los Angeles-Pac. R. R. 1st Cons.	5	52,000	104.56	4.63	2,407.60
Los Angeles-Pac. R. R. of Cal.	5	131,000	102.02	4.87	6,379.70
Marin Water & Power Co.	5	2,000	100.00	5.00	100.00
Market St. Cable Co.	6	86,000	100.18	5.93	5,099.80
Market St. Ry. 1st Cons.	5	170,000	93.50	5.75	9,775.00
Northern Railway of Cal.	5	72,000	112.70	4.20	3,024.00
Northern Cal. Railway	5	15,000	106.81	4.45	667.50
Northern Cal. Power Co.	5	250,000	100.06	5.00	12,500.00
Northern Cal. Power Cons.	5	51,000	92.59	5.47	2,789.70
Oakland Gas Light & Heat	5	11,000	101.45	4.60	506.00
Oakland Transit Co.	6	30,000	107.40	4.55	1,365.00
Oakland Transit	5	13,000	103.73	4.70	611.00
Oakland Transit Cons.	5	54,000	102.39	4.82	2,602.80
Oakland Traction Cons.	5	82,000	97.59	5.20	4,264.00
Oakland Traction Co.	5	173,000	90.89	5.68	9,826.40
Oakland Water Co. Gtd.	5	198,000	94.73	7.00	13,860.00
Omnibus Cable Co.	6	74,000	102.14	5.56	4,114.40
Pacific Gas & Elect. Co.	5	450,000	91.70	5.55	24,975.00
Pacific Gas Improvement	4	139,000	89.25	4.90	6,811.00
Pacific Electric Ry.	5	361,000	104.55	4.70	16,967.00
Pacific Light & Power Co.	5	228,000	96.62	5.22	11,901.60
Pacific Light & Power Gtd.	5	132,000	97.69	5.16	6,811.20
Pacific Tel. & Tel. Co.	5	2,437,000	100.05	5.00	121,850.00

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet—Year 1912.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Sacramento Elec. Gas & Ry.	5	102,000	103.35	4.70	4,794.00
San Joaquin Light & Power Co.	5	485,000	98.63	5.10	24,735.00
San Joaquin L. & P., Series A	6	34,000	102.16	5.85	1,989.00
S. F., Oakland & San Jose Ry.	5	154,000	104.46	4.66	7,176.40
S. F., Oakland & San Jose Ry. 2d Mtg.	5	116,000	96.53	5.30	6,148.00
Sierra Railway of Cal.	6	1,000	100.00	6.00	60.00
Southern Pac. R. R. 1st Cons.	5	8,000	112.34	4.20	336.00
Southern Pac. Branch Ry.	6	57,000	126.46	4.27	2,433.90
Southern Pac. R. R. 1st Refg.	4	1,133,000	94.74	4.27	48,379.10
Spring Valley Water Gen. Mtg.	4	1,880,000	94.21	4.62	88,856.00
United Gas & Elec. Co.	5	124,000	100.46	4.96	6,150.40
Valley Counties Power	5	177,000	101.07	4.95	8,761.50
Totals		15,722,000	....	....	805,334.80

Average Net Return = Basis 805,334.80 ÷ 15,722,000. Total Sales = 5.12%, Average Net Rate.

Average Net Return after deduction for Spring Valley Water Co. Bonds—

Basis 716,478.80 ÷ 13,842,000 Sales = 5.17%, Average Net Rate.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1913.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Associated Oil Co.	5	165,000	99.95	5.05	8,332.50
Bay Counties Power	5	113,000	100.53	4.98	5,627.40
Cal. Central Gas & Elec. Co.	5	17,000	100.55	4.90	833.00
Cal. Gas & Elec. Gen. Mfg.	5	234,000	101.05	4.91	11,489.40
Cal. Gas & Elec. Unifying	5	1,275,000	92.13	5.80	73,950.00
Coast Counties Light & Power	5	10,000	94.75	5.30	530.00
California St. Cable Co.	5	6,000	100.16	5.00	300.00
Cal. Wine Association	5	125,000	97.55	5.30	6,625.00
Central Cal. Traction	5	17,000	97.55	5.20	884.00
City Electric Co.	5	106,000	82.07	6.50	6,890.00
Contra Costa Water Co.	5	14,000	99.09	5.50	770.00
Contra Costa Water Gen. Mfg.	5	22,000	94.63	7.87	1,731.40
Edison Electric of L. A.	5	25,000	101.45	4.80	1,200.00
Edison Light and Power Co.	6	6,000	105.00	5.25	315.00
First Federal Trust	5	3,000	100.33	4.99	149.70
Great Western Power	5	419,000	83.15	6.20	25,978.00
Hawaiian Coml. & Sugar	5	6,000	102.75	4.50	270.00
Los Angeles Gas & Elec. Co.	5	131,000	98.00	5.15	6,746.50
Los Angeles G. & Elec. Corpn.	5	30,000	92.74	5.53	1,659.00
Los Angeles Railway	5	175,000	103.33	4.77	8,347.50
Los Angeles Railway Corpn.	5	114,000	95.95	5.30	6,042.00
Los Angeles Lighting Co.	5	6,000	99.64	5.02	301.20
Los Angeles Pac. R. R. 1st Cons.	5	62,000	102.27	4.80	2,976.00
Los Angeles Pac. R. R. of Cal.	5	32,000	96.00	5.26	1,683.20

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1913.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Market St. Ry. 1st Cons.	5	63,000	91.90	6.00	3,780.00
Northern Ry. of Cal.	5	86,000	108.20	4.47	3,844.20
Northern Cal. Ry.	5	178,000	106.75	4.40	7,832.00
Northern Cal. Power	5	51,000	99.70	5.03	2,565.30
Northern Cal. Power Cons.	5	14,000	89.09	5.72	800.00
Oakland Gas Light & Heat	5	22,000	100.30	4.90	1,078.00
Oakland Transit Co.	6	30,000	106.51	4.53	1,359.00
Oakland Transit	5	5,000	103.10	4.75	237.50
Oakland Trans Cons.	5	49,000	100.81	4.93	2,415.70
Oakland Traction Cons.	5	25,000	89.65	5.88	1,470.00
Oakland Traction Co.	5	51,000	91.40	5.70	2,907.00
Oakland Water Co. Gtd.	5	70,000	96.20	7.00	4,900.00
Omnibus Cable Ry.	6	43,000	101.70	5.62	2,416.60
Pacific Gas Improvement	4	52,000	89.00	4.95	2,574.00
Pacific Gas & Elec. Co.	5	609,000	85.70	5.90	35,931.00
Pacific Electric Ry.	5	384,000	102.47	4.85	17,024.00
Pacific Light & Power Co.	5	9,000	94.17	5.40	486.00
Pacific Light & Power Gtd.	5	46,000	97.02	5.20	2,392.00
Pacific Tel. & Tel. Co.	5	1,168,000	98.44	5.12	59,801.60
Sacramento Elec. Gas & Ry.	5	129,000	101.46	4.85	6,254.50
San Joaquin Light & Power	5	413,000	99.20	5.05	20,856.50
San Joaquin LA. & Power Series A	6	31,000	101.40	5.95	1,844.50
S. F. Oakland & San Jose Ry.	5	96,000	101.27	4.90	4,704.00

EXHIBIT 101, P. 25.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1913.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
S. F. Oakland & San Jose Ry. 2d Mtg.	5	28,000	92.30	5.70	1,596.00
S. F. Oakland & San Jose Cons. Ry.	5	8,000	71.60	7.50	600.00
Sierra Railway of Cal.	6	13,000	98.40	6.12	795.60
Southern Pacific R. R. 1st Cons.	5	10,000	106.02	4.60	460.00
Southern Pacific Branch Ry.	6	10,000	121.62	4.50	450.00
Southern Pac. R. R. 1st Refd.	4	719,500	91.03	4.48	32,233.60
Spring Valley Water Co. Gen. Mtg.	4	1,552,000	91.57	5.00	77,600.00
United Gas & Elec. Co.	5	99,000	100.20	4.98	4,930.20
Valley Counties Power	5	80,000	99.36	5.05	4,040.00
Totals		9,256,500			483,789.60

Average Net Rate = Basis 483,789.60 ÷ 9,256,500. Total Sales = 5.22%, Average Net Rate.
 Average Net Return after deduction for Spring Valley Water Co. Bonds—
 Basis 406,189.60 ÷ 7,704,500 Sales = 5.27%, Net Rate.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.
 From Official Report—Monthly Sheet.—Year 1914.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Associated Oil Co.	5	205,000	97.82	5.33	10,926.50
Bay Counties Power Co.	5	43,000	100.38	4.97	2,137.10
Cal. Central Gas & Electric Co.	5	30,000	100.38	4.97	1,491.00
Cal. Gas & Elec. Gen. Mtg.	5	190,000	100.70	4.95	9,405.00
California St. Cable Co.	5	4,000	100.00	5.00	200.00
California Wine Association	5	49,000	94.87	5.70	2,793.00
Cal. Telephone & Lt. Co.	6	14,000	100.00	6.00	840.00
City Electric Co.	5	160,000	82.43	6.45	10,320.00
Cal. Gas & Elec. Unifying	5	649,000	93.06	5.53	35,889.70
Coast Counties Light & Power	5	2,000	93.75	5.40	108.00
Edison Light & Power Co.	6	11,000	105.05	5.15	566.60
First Federal Trust	5	4,000	101.62	4.90	196.00
Great Western Power	5	313,000	79.57	6.55	20,501.50
Hawaiian Coml. & Sugar Co.	5	33,000	100.23	4.95	1,633.50
Los Angeles Gas & Elec. Co.	5	172,000	99.50	5.05	8,686.00
Los Angeles Gas & Elec. Corp.	5	37,000	94.27	5.42	2,005.40
Los Angeles Railway Co.	5	136,000	100.20	5.00	6,800.00
Los Angeles Railway Corp.	5	17,000	91.46	5.62	955.40
Los Angeles Lighting Co.	5	9,000	99.62	5.06	455.40
Los Angeles Pac. R. R. 1st Cons.	5	30,000	101.12	4.90	1,470.00
Los Angeles Pac. R. R. of Cal.	5	12,000	94.21	5.40	648.00
Market St. Ry. 1st Cons.	5	35,000	85.83	6.92	2,422.00
Northern Railway Co. of Cal.	5	8,000	108.37	4.45	356.00
Northern Cal. Power Co.	5	40,000	99.53	5.02	2,008.00

EXHIBIT 101, P. 27.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1914.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Northern Cal. Power Cons.	5	79,000	78.20	6.62	5,229.80
Oakland Gas Light & Heat	5	24,000	99.15	5.50	1,320.00
Oakland Transit Co.	6	30,000	103.75	4.90	1,470.00
Oakland Transit	5	2,000	100.50	5.05	101.00
Oakland Traction Cons.	5	9,999	86.95	5.62	505.00
Oakland Traction Co.	5	6,000	82.00	6.58	394.80
Omnibus Cable Co.	6	48,000	99.45	6.12	2,937.60
Pacific Gas & Elec. Co.	5	355,000	86.78	5.92	21,016.00
Pacific Gas Improvement	4	2,000	88.50	5.05	101.00
Pacific Electric Ry	5	452,000	100.56	4.95	22,374.00
Pacific Light & Power Co.	5	52,000	90.00	5.80	3,016.00
Pacific Light & Power Gtd.	5	5,000	95.40	5.30	265.00
Pacific Tel. & Tel. Co.	5	608,000	97.65	5.20	31,616.00
Sacramento Elec. Gas & Ry.	5	50,000	100.75	4.90	2,450.00
San Joaquin Light & Power	5	105,000	98.39	5.10	5,355.00
San Joaquin Lt. & Power Series A	6	60,000	100.89	5.93	3,558.00
S. F. Oakland & San Jose Ry.	5	78,000	100.31	4.95	3,861.00
S. F. Oakland & San Jose Ry. 2nd Mtg.	5	41,000	87.86	6.12	2,509.20
S. F. Oakland & San Jose Cons. Ry.	5	36,000	75.55	7.12	2,563.20
S. F. Oakland & San Jose Cons. Ry.	6	10,000	89.00	6.95	695.00
Sierra Railway of Cal.	6	28,000	122.48	4.45	1,246.00
Southern Pacific Branch Ry.	4	565,000	91.56	4.45	25,142.50
Southern Pacific R. R. 1st Refg.					

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EXHIBIT 101, P. 28.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1914.—Continued.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Spring Valley Water Co. Gen. Mtg.	4	1,030,000	92.31	5.00	51,500.00
United Gas & Elec. Co.	5	9,000	98.88	5.10	459.00
Valley Counties Power	5	87,000	100.32	4.97	4,323.90
Totals		5,974,000			316,823.00

Average Net Return = Basis 316,823 ÷ 5,974,000. Total Sales = 5.30, Average Net Rate.

Average Net Return after deduction for Spring Valley Water Co. Bonds—

Basis 265,323.00 ÷ 4,944,000 Sales = 5.36%, Average Rate.

EXHIBIT 101, P. 29.

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Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1915.

	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Associated Oil Co.	5	487,000	98.21	5.30	25,811.
Bay Counties Power Co.	5	140,000	100.52	4.95	6,930.
Cal. Central Gas & El. Co.	5	9,000	101.24	4.90	441.
Cal. Gas & El. G. M. & C. T.	5	151,000	100.86	4.90	7,399.
Cal. Gas & El. Co. Unifying	5	1,441,000	94.52	5.40	77,814.
California St. Cable Co.	6	25,000	106.43	5.25	1,312.50
California Telephone & Lt.	6	1,900	99.	6.05	60.50
California Wine Association	5	157,000	93.63	6.87	10,785.90
Central Cal. Traction Co.	5	12,000	82.08	6.55	786.
City Electric Co.	5	379,000	86.37	6.12	23,194.80
Coast Counties Lt. & Power	5	10,000	92.52	5.50	550.
Edison Light & Power	6	9,000	105.77	4.87	438.30
E. I. du Pont Nemours	4.5	13,000	90.	5.30	689.
First Federal Trust	5	1,000	100.	5.	50.
Great Western Power	5	551,000	81.08	6.38	35,153.80
Hawaiian Coml. & Sugar	5	8,000	100.47	4.87	389.60
Honolulu Rapid Transit & L. Co.	6	21,000	104.04	5.55	1,165.50
Los Angeles Gas & El. Co.	5	248,000	98.42	5.12	12,697.60
Los Angeles Gas & El. Corp.	5	6,000	93.33	5.50	0.330.
Los Angeles Railway Co.	5	168,000	96.32	5.25	8,820.
Los Angeles Railway Corp.	5	38,000	86.34	6.10	2,318.
Los Angeles Lighting Co. Gtd.	5	18,000	99.43	5.10	918.
Los Angeles-Pac. R. R. 1st Con.	5	76,000	95.95	5.38	4,088.80

1915.—Continued.

Bond.	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Los Angeles-Pac. R. R. of Cal.	5	6,000	89.	5.75	345.*
Market St. Ry. 1st Con.	5	88,000	106.52	4.55	4,004.
Northern Railway of Cal.	5	20,000	102.75	4.75	950.
Northern Cal Railway	5	20,000	92.52	5.70	1,140.
Northern Cal. Power	5	72,000	72.85	7.12	5,126.40
Northern Cal. Power Cons.	5	31,000	100.50	4.50	1,395.*
Oakland Gas, Lt. & Heat	5	8,000	83.38	6.70	536.
Oakland Transit Co.	5	1,000	91.	5.87	58.70
Oakland Transit	5	42,000	89.35	5.	2,100.
Oakland Transit Cons.	4	671,000	88.42	5.87	39,687.70
Omnibus Cable Railway	5	428,000	92.14	5.55	23,754.
Pac. Gas Improvement	5	42,000	89.80	5.75	2,415.
Pacific Gas & El. Co.	5	16,000	91.87	5.68	908.80
Pacific Electric Ry.	5	37,000	101.08	4.87	1,801.90
Pacific Light & Power Co.	5	33,000	96.50	5.25	1,732.50
Pacific Light & Power—Gtd.	5	7,000	100.96	4.95	346.50
Sacramento Gas, El. & Ry.	6	.....	...	.....	.....*
San Joaquin Lt. & Power Co.	6	.....	...	.....	.....*
San Joaquin Lt. & Power Corp.	6	.....	...	.....	.....*
S. F., Oak. & San Jose Ry.	5	3,000	105.87	4.60	138.
S. F., Oak. & San Jose Ry. 2nd Mtg.	5	113,000	119.74	4.60	5,198.
S. F., Oak. & San Jose Cons. Ry.	5	1,617,500	86.22	4.75	76,831.25
S. P. R. R. 1st Cons. Gtd.	4	1,742,000	92.88	5.10	88,842.
S. P. Branch Ry. of Cal.	4	.....	.....	.....	.....
S. P. R. R. Co. 1st Refunding	4
Spring Valley Water G. M.	4

EXHIBIT 101, P. 31.
1915.—*Continued.*

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Bond.	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
United Gas & El. Co.	5	51,000	100.35	4.95	2,424.50
Valley Counties Power	5	20,000	99.75	5.05	1,010.
		<u>9,037,500</u>			<u>482,888.55</u>

NOTE.—Bonds eliminated from computation owing to price being speculative, based on reorganization.

N*95.—Average Rate is obtained by dividing Basis by Par Value of Sales.

Basis 482,888.55 ÷ 9,037,500 Sales Par Value = 5.34% Net Rate.

Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange.

Six Months Ending June 30, 1916.

From Official Report—Monthly Sheet.

Bond.	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Associated Oil Co.	5	172,000	102.43	4.75	8,170.
Bay Counties Power Co.	5	18,000	102.34	4.75	855.
Cal. Central Gas & El. Co.	5	8,000	102.15	4.80	384.
Cal. Gas & Electric G. M. & C. T.	5	79,000	102.34	4.80	3,792.
Cal. Gas & Elec. Co. Unifying	5	1,298,000	98.62	5.10	66,198.
California Wine Assn.	5	16,000	97.	5.45	872.
City Electric Co.	5	204,000	88.53	5.87	11,974.80
City Investment Co.	5	155,000	97.94	4.70	7,285.
Coast Counties Light & Power	5	21,000	92.15	5.55	1,165.50
Edison Light & Power Co.	6	7,000	105.37	4.80	336.
First Federal Trust Co.	5	4,000	100.75	4.95	198.
Great Western Power Co.	5	415,000	86.40	5.90	24,485.
Honolulu Rapid T. & Land Co.	6	6,000	103.83	5.55	333.
Los Angeles Electric Co.	5	9,000	100.12	5.	450.
Los Angeles Gas & El. Co.	5	85,000	101.12	4.90	4,165.
Los Angeles Gas & El. Corp.	5	39,000	98.72	5.10	1,989.
Los Angeles Railway Co.	5	89,000	97.94	5.20	4,628.
Los Angeles Railway Corp.	5	12,000	90.79	5.75	690.
Los Angeles Lighting Corp.	5	11,000	101.18	4.80	528.
L. A.—Pac. R. R. 1st Con. Mtg.	5	21,000	95.86	5.30	1,113.*
Market St. 1st Cons. ....	.	.....	...	....	....

EXHIBIT 101, P. 33.

1439

6 mos. June 30, 1916.—Continued.

Bond.	Interest rate.	Sales, par value.	Average rate.	Net interest rate.	Basis.
Natomas Company of Cal.	5	23,000	109.71	4.30	989.
Northern Railway of Cal.	5	7,000	102.90	4.70	329.
Northern Cal. Railway	5	7,000	98.04	5.15	360.50
Northern Cal. Power Co.	5	36,000	81.17	6.37	2,293.20
Northern Cal. Power Cons. ....	..	.....	...	....	...
Oakland Transit Co. ....	..	.....	...	....	...
Oakland Traction Cons. ....	..	.....	...	....	...
Oakland Traction Co. ....	..	.....	...	....	...
Omnibus Cable Railway	4	1,000	90.25	4.75	47.50
Pacific Gas Improvement Co.	5	395,000	92.25	5.55	21,922.50
Pacific Gas & Elect. Co.	5	186,000	93.29	5.50	10,230.
Pacific Electric Ry. Co.	5	88,000	94.20	5.40	4,752.
Pacific Light & Power Co.	5	8,000	95.90	5.25	420.
Pacific Light & Power—Gtd.	5	905,000	100.66	4.95	44,797.50
Pacific Tel. & Tel. Co.	5	190,000	101.10	4.87	9,253.
Sacramento El. Gas & Ry.	5	88,000	99.84	5.05	4,444.
San Joaquin Light & Power	6	14,000	101.71	5.87	821.80
San Joaquin Light & Power Co. Corp. ....	..	.....	...	....	...
S. F., Oak. & San Jose Ry.	5	1,000	107.	4.50	45.
S. F., Oak. & San Jose Cons. Ry.	5	8,000	121.62	4.40	352.
S. P. R. R. 1st Cons. Gtd. G.	6	.....	...	....	...
S. P. Branch Ry. of Cal. ....	..	.....	...	....	...

S. P. R. R. Co. 1st Refunding	4	647,000	90.49	4.50	29,115.
Spring Valley Water Co. G. M.	4	437,000	95.42	4.80	20,976.
United Gas & Elect. Co.	5	25,000	101.77	4.85	1,212.50
Valley Counties Power Co.	5	26,000	102.22	4.80	1,248.
		<hr/> 5,761,000			<hr/> 293,219.80

1440

EXHIBIT 101, P. 34.

6 mos. June 30, 1916.

NOTE.—*Bonds eliminated from computation owing to price being speculative—based on reorganization.

NOTE.—Average rate is obtained by dividing basis by par value of sales.

Basis $293,219.80 \div 5,761,000$ Sales = 5.09% Net Rate.

EXHIBIT 101, P. 41.

1441

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1913.

	Par value.	Shares sold.	Average price.	Div'd %.	Net interest rate.	Basis.
Spring Valley Water Company	100	20,871	56.00	2.	3.57	74,509.47
Pacific Lighting Corp. Pfd.....	100	863	74.05	5.	6.75	5,625.25
Pacific Lighting Corp. Com.	100	430	106.50	8.	7.50	3,225.00
Fireman's Fund Ins. Co.	100	613	235.80	16.	6.78	4,156.14
American National Bank	100	186	132.12	7.	5.29	983.94
Anglo California Trust Co.	100	235	125.00	6.	4.80	1,128.00
Anglo & London Paris Nat'l Bank	100	250	149.20	8.	5.36	1,340.00
Bank of California N. A.	100	780	197.65	9.	4.55	3,549.00
First National Bank of S. F.	100	240	226.43	13.	5.74	1,377.60
Savings Union Bank & Trust Co.	100	70	247.50	12.	4.85	339.50
California St. Cable Co.	100	141	125.00	7.20	5.76	812.16
E. I. du Pont de Nemours Pfd.....	100	10	86.50	5.	5.78	57.80
Amalgamated Oil Co.	100	950	82.90	13.50	16.28	15,466.00
Associated Oil Co.	100	43,671	41.10	3.	7.30	318,798.30
Alaska Packers Association	100	1,895	82.68	6.	7.25	13,738.75
Armstrong Co. of N. Y. Pfd.....	100	641	99.83	7.	7.04	4,512.64
Cal. Fruit Cannery Association	100	1,029	116.75	7.20	6.16	6,338.64
Cal. Wine Association	100	1,078	81.43	6.	7.36	7,934.08
Hunt Bros. & Co. Pfd.....	100	100	100.00	6.	7.00	700.00
Pacific Tel. & Tel. Co. Pfd.....	100	2,093	92.86	6.	6.46	13,520.78
California Ins. Co.	40	85	74.00	15.	8.10	688.50

1442

EXHIBIT 101, P. 42.

*Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange.**From Official Report—Monthly Sheet.—Year 1913.—Continued.*

	Par value.	Shares sold.	Average price.	Div'd %.	Net Interest rate.	Basis.
Mutual Savings Bank	50	140	76.66	8.	5.21	729.40
Security Savings Bank	250	20	328.00	6.	4.57	91.40
Giant Consolidated Co.	100	1,024	91.93	7.	7.61	7,792.64
Union Oil Co.	100	5	90.00	7.20	8.00	40.00
Philippine Tel. & Tel. Co.	20	1,016	22.25	8.	7.19	7,305.04
		<hr/> 78,436				<hr/> 494,960.03

Net Rate of Return.

Par Value of Stocks Sold = 78,436 x 100 = 7,843,600.

Basis 494,960.03 ÷ 7,843,600 = 6.31% Net Rate.

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1914.

	Par value.	Shares sold.	Average price.	Div'd %.	Net interest rate.	Basis.
Spring Valley Water Company	100	10,491	55.18	2.50	4.53	47,524.23
Pacific Lighting Corp. Pfd.	100	1,075	74.37	5.	6.72	7,224.00
Pacific Lighting Corp. Com.	100	150	97.83	8.	8.17	1,225.50
Fireman's Fund Ins. Co.	100	524	235.57	16.	6.80	3,563.20
Anglo & London Paris Nat'l Bank	100	310	139.10	8.	5.75	1,782.50
Bank of California N. A.	100	861	193.08	9.	4.61	3,969.21
First National Bank of S. F.	100	125	218.07	13.	5.96	745.00
Savings Union & Trust Co.	100	79	248.12	12.	4.83	381.57
California St. Cable Co.	100	30	120.00	7.20	6.00	180.00
Amalgamated Oil Co.	100	280	80.17	15.	18.71	5,238.80
Associated Oil Co.	100	21,417	39.82	3.	7.53	161,270.01
Alaska Packers Association	100	2,305	75.65	6.	7.93	18,278.65
Armsby Co. of N. Y. Pfd.	100	5	91.00	7.	7.69	38.45
Cal. Fruit Cannery Association	100	703	114.70	7.20	6.27	4,407.81
Cal. Wine Association Pfd.	100	168	75.00	6.	8.00	1,344.00
Cal. Wine Association Com.	100	3,363	49.14	5.	10.17	34,201.71
Pacific Tel. & Tel. Co.	100	1,155	88.90	6.	6.74	7,784.70
Giant Consol. Co.	100	1,340	82.62	6.	7.26	9,728.40
Philippine Tel. & Tel. Co.	20	375	19.93	8.	8.02	3,007.50
						<hr/> 311,895.24

Net Rate of Return.

Par Value of Stocks = 44,756 x 100 = 4,475,600.

Basis 311,895.24 ÷ 4,475,600 = 6.96% Net Rate.

NOTE.—Session of San Francisco Stock and Bond Exchange suspended from July 31st to December 1st, 1914, owing to financial disturbance caused by the war in Europe.

44,756

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—Year 1915.

Stock.	Par value.	No. shares.	Dividend %.	Average per share.	Net int. rate.	Basis.
American Natl. Bank	100	282	7.	120.	5.83	1,644.06
Anglo-Cal. Trust Co.	100	165	6.	106.63	5.43	895.95
Anglo, L. P. Natl. Bank	100	394	8.	134.86	5.93	2,336.42
Bank of California N. A.	100	2,278	9.	188.	4.80	10,934.40
First Nat. Bank of S. F.	100	445	13.	216.71	6.	2,670.
Mercantile Natl. Bank	100	425	10.	217.50	4.58	1,946.50
Savings Union Bk. & T. Co.	100	241	12.	240.43	5.	1,205.
Spring Valley Water Co.	100	25,403	2.5	53.31	4.68	118,886.04
Pacific Gas & El. 1st Pfd.	100	3,647	6.	86.94	5.19	18,927.93
Pacific Gas & El. Pfd.	100	1,884	6.	85.39	7.	13,188.
Pacific Lighting Corp. Pfd.	100	1,550	5.	73.97	6.75	10,462.50
Pacific Lighting Corp. Com.	100	1,995	8.	93.42	8.56	17,077.20
Fireman's Fund Ins. Co.	100	618	16.	241.37	6.63	4,097.30
Humboldt Savings Bank.	100	5	6.	105.	5.70	28.50
E. I. du Pont de Nemours Pfd.	100	556	5.	93.58	5.34	2,969.04
E. I. du Pont de Nemours Com.	100	388	8.	313.17	2.55	989.40
Giant Cons. Co.	100	2,536	6.	96.91	6.20	15,723.20
Alaska Packers Association	100	5,332	6.	90.04	6.66	35,511.12
Cal. Fruit Cannery Assn.	100	1,198	7.20	121.20	6.	7,188.
Cal. Wine Association, Pfd.	100	647	6.	65.87	9.10	5,887.70
Amalgamated Oil Co.	100	1,865	11.25	76.07	14.80	27,602.
Associated Oil Co.	100	83,493	3.	52.57	5.70	475,910.10

EXHIBIT 101, P. 45.
1915.—Continued.

Stock.	Par value.	No. shares.	Divi- dend %.	Average per share.	Net int. rate.	Basis.
Armsby Co. of N. Y.	100	40	7.	91.02	7.68	307.20
California Wine Assn.	100	2,220	5.	34.18	5.70	12,654.
Pacific Tel. & Tel. Co. Pfd.	100	2,635	6.	92.37	6.50	17,127.10
		<hr/>				<hr/>
		140,242				806,168.66

Net Rate of Return.

Par Value of Stock Sold = 140,242 x 100 = 14,024,200.

Basis 806,168.66 ÷ 14,024,200 = 5.74% Net Rate.

Average Net Return on Stocks Listed and Sold on San Francisco Stock and Bond Exchange.

From Official Report—Monthly Sheet.—For Six Months Ending June 30, 1916.

Stock.	Par value.	Sales No. shares.	Dividend %.	Average per share.	Net int. rate.	Basis.
Spring Valley Water	100	15,444	3.5	61.28	5.71	88,185.24
Northwestern El. Co. Pfd.	100	1,585	6.	84.66	7.08	11,221.80
Pacific Gas & El. 1st Pfd.	100	6,805	6.	90.31	6.64	45,185.22
Pacific Gas & El. Pfd.	100	3,337	6.	92.68	6.47	21,590.39
Pacific Lighting Pfd.	100	655	5.	81.81	6.11	4,002.05
Pacific Lighting Corp.	100	639	8.	106.53	7.51	4,798.88
Fireman's Fund Ins. Co.	100	533	16.	261.93	6.10	3,251.30
Anglo-Cal. Trust Co.	100	129	6.	106.20	5.65	718.85
Anglo-London Paris Natl. Bk.	100	503	8.	141.38	5.65	2,841.95
Bank of Cal. N. A.	100	846	9.	191.58	4.68	3,959.28
First Natl. Bank of S. F.	100	430	13.	227.30	5.72	2,459.60
Savings Union Bk. & T. Co.	100	175	12.	239.14	5.14	899.50
Amalgamated Oil Co.	100	1,305	12.	84.21	14.25	18,596.25
Associated Oil Co.	100	49,300	4.	67.80	5.90	290,870.
Alaska Packers Assn.	100	5,474	6.	111.67	5.37	29,395.38
California Fruit Can. Assn.	100	1,373	7.2	126.44	5.70	7,846.10.
Cal. Wine Association Pfd.	100	590	6.	63.07	9.50	5,605.
Pacific Tel. & Tel. Co. Pfd.	100	2,360	6.	96.10	6.24	14,726.40
Net Rate of Return.		91,483				556,154.19

Par Value of Stocks = 91,483 x 100 = 9,148,300.

Basis 556,154.19 ÷ 9,148,300 = 6.08% Net Rate.

1447 NOTE.—Pages numbered 7 to 19, inclusive, of Exhibit No. 101 show bond sales on the San Francisco Stock and Bond Exchange for the years 1907 to 1911, inclusive, in the same manner as pages numbered 20 to 34, inclusive, show bond sales on said exchange for the years 1912 and following, but it is not deemed necessary to include them in the record on appeal. Pages numbered 35 to 40, inclusive, of Exhibit No. 101 show stock sales on the San Francisco Stock and Bond Exchange for the years 1907 to 1912, inclusive, in the same manner as pages numbered 41 to 46, inclusive, show similar sales for the years 1913 and following.

The witness further testified in explanation of Exhibit No. 101 as follows:

The bonds listed on page 23 of Exhibit No. 101 were bonds upon which interest had been regularly paid and in my opinion were comparable with the securities of the Pacific Gas and Electric Company.

I arrived at the figures shown on page 23 of Exhibit No. 101 as follows: I took the official list of the San Francisco Stock and Bond Exchange and took the highest and lowest quotations and made an average by taking the arithmetical mean. The par value of sales multiplied by the net interest rate gave me a basis. The aggregate of the monthly basis divided by the total sales equals the average rate or cost of a \$100.00 bond. In the case of the bonds, the
 1448 average rate thus obtained compared with Rollins' table of bond values according to the rate per cent and the unexpired time to maturity. The other pages of Exhibit No. 101 showing bond sales on the San Francisco Stock and Bond Exchange were prepared in the same way as page No. 23. The pages of Exhibit No. 101 which show stock sales on the San Francisco Stock and Bond Exchange were prepared in the same way as the pages showing bond sales; that is to say, I made a list of the stocks every month and listed them with the number of shares sold at the average price which I arrived at by taking the highest and lowest quotations and then computing on the dividend declared the rate of interest on the market value—the average sales price; that is to say, I took the sales of stock listed from the monthly official list, taking the highest and lowest quotation and taking the arithmetical mean for an average price. The par value of sales each month multiplied by the net interest rate gives the basis; the aggregate of monthly basis divided by the total sales par equals the average rate or cost of stock per 100. The par value of the stock multiplied by the rate of dividend and that amount divided by the average rate or cost of stock equals the average net rate of return; the basis obtained by the sum of the net rate so obtained on all stocks sold divided by the total par value will equal the average net return.

In compiling the stock list of this exhibit, I included only
 1449 dividend-paying stocks and stocks that were considered from an investment point of view. I eliminated sugar stocks from these lists because I consider the sugar business hazardous, depending as it does on conditions in other parts of the world. The fluctuations

in the market price of those stocks have been very wide. The price of sugar stocks is affected by changes in the tariff as well as by agricultural conditions in the Hawaiian Islands and was greatly affected by war conditions. I do not think that sugar stocks compete in the market with securities of the kind issued by the Pacific Gas and Electric Company. I think I have included in Exhibit No. 101 all of the dividend-paying stocks except sugar stocks since the year 1913.

The tables on pages 1 to 4 of Exhibit No. 101 are recapitulations of the statistical matter contained in the remaining pages of that exhibit.

On cross-examination the witness testified as follows:

In connection with my compilation of the data contained in defendants' Exhibit No. 101, I did not make any investigation of the financial condition of any of the companies whose bonds and stocks were included in those lists. I know in a general way the earnings of some of those companies. But the lists contained in Exhibit No. 101 were made up from the official reports of the San Francisco

Stock and Bond Exchange and the securities mentioned in 1450 those lists had to be approved by the San Francisco Stock and Bond Exchange before they were listed. I do not know of my own knowledge the financial condition of the companies whose stocks and bonds were sold on the exchange. In this exhibit I have shown actual sales and the interest rate in the case of bonds and the rate of dividends actually declared during the time covered by this exhibit and have made no further analysis of the conditions of the companies. I made up Exhibit No. 101 for the purpose of showing what investors actually received on the bonds and stocks that were sold on the San Francisco Stock and Bond Exchange; that is to say, stocks on which dividends were paid and bonds on which interest was paid. In general, I do not know the relation existing between the value of the assets of the companies whose securities are included in Exhibit No. 101 and the indebtedness of those companies.

1451 Mr. A. F. HOCKENBEAMER, recalled for the plaintiff in rebuttal, testified in substance, as follows:

I have examined the testimony and exhibits presented in this case by Mr. William A. Boston and Mr. W. D. O'Brien with reference to return on money, particularly Mr. Boston's Exhibit #101, and have put into writing the result of my analysis of the testimony of Mr. Boston and of Exhibit #101.

I have examined Defendant's Exhibit No. 101, being statement of Wm. A. Boston, setting forth, among other things, the returns yielded to investors (a) on bonds of the City of San Francisco and (b) on stocks and bonds purchased on the San Francisco Stock and Bond Exchange.

I might say in a general way that stock and bond exchanges are not generally regarded as primary markets for securities issued for

the purpose of financing corporations. The corporations usually place their securities for their capital needs with investment banking houses, and they in turn place these securities with investors, through selling organizations, largely by personal solicitation, and also to a large extent through the mails, by circulars and advertisements sent through the mails; so that transactions on stock and bond exchanges are really transactions between investors. It is generally considered desirable to have securities listed on stock and bond exchanges because it makes them better collateral, and in that way facilitates their sale to investors, and it also affords an additional opportunity
 1452 for conversion which is an important factor; but the money required by corporation- is not obtained in that way; in fact, I don't know of a single instance in which a corporation has raised money by selling stocks and bonds through an exchange.

The following observations upon the matters set forth in this exhibit No. 101 are based upon thirteen years' experience in the business of investment banking and in the financing of California public utilities.

In my opinion, market quotations for stocks and bonds, whether made on the San Francisco Stock and Bond Exchange, or elsewhere, afford but slight indication unless accompanied by other facts of the rate of return which a public utility, such as the Pacific Gas and Electric Company, should be permitted to earn upon the fair value of its property whether such rate of return be predicated (a) upon allowing profits comparable with profits earned by capital in other enterprises involving approximately the same hazards, or (b) upon allowing profits sufficiently large to enable the utility to establish in the money and securities markets the financial credit necessary to make it possible, through the sale of securities, to attract to the enterprise the new capital required to prevent insolvency and to meet the obligation imposed upon it by law to serve the public properly and adequately.

1453 It is a transposition of cause and effect to assume that the "net interest rate," using the expression embodied in Defendant's exhibit No. 101, is synonymous with a "fair rate of return."

Market quotations for stocks and bonds are the measure of the credit of the utility issuing them. This credit rests chiefly upon the rate of return, that is, upon the percentage of profit which the utility can earn, or is permitted to earn, upon the value of its property.

If this rate of return is merely sufficient to enable the utility to earn the amount required to pay interest on its bonds and dividends on its stocks, without any margin for contingencies, its credit will be impaired, the demand for its securities will lessen, market quotations will shrink, and the investor willing to take the risk of purchasing these securities at the depreciated prices will receive a higher "net interest rate."

This series of consequences will be reversed and the "net interest rate" will be lowered if the rate of return is sufficient to enable the utility to earn such a margin of safety in excess of its interest and dividend requirements as will inspire confidence in the minds of investors in the certainty of the return on their investment. The rate

of return, whether lawfully permitted, or economically possible, in the absence of opportunity for speculative profits, determines 1454 the "net interest rate" and the latter would be destroyed if substituted for the former either by law or economic forces. I am using the term "net interest rate" throughout this testimony as it is used in this exhibit No. 101.

The so-called "net interest rates" shown in Exhibit No. 101 are derived from market quotations on retail transactions in securities between investors. These securities are, in a sense, a finished product, in the making of which the utility has had to incur expenditures and assume obligations which it can only meet from the earnings arising out of the percentage of profit or fair rate of return which it receives upon the value of its property. Reference is made in this connection to the statement already made by me in this case concerning "cost of Money to Public Utilities," particularly to sections (11), "Margin of Safety—General," (12), "Margin of Safety Required for Bonds," (13) "Margin of Safety for Preferred Stock," (14), "Margin of Safety for Common Stock," (15) "Utilities Cannot Obtain Needed Capital Entirely from Sales of Bonds," (16), "Cash Situation Not Measurable by Income Account," (17), "Sinking Funds," and (18) "Bond and Preferred Stock Discount and Expense."

Stock and Bond Exchanges are essentially retail institutions and do not afford the facilities necessary for the marketing of investment bonds and stocks in the large volume required by utilities to 1455 finance the extension of their facilities, refunding of maturing obligations, etc. Illustrative of this may be mentioned the fact that, as shown on Page 22 of defendant's exhibit No. 101, the total par value of bonds sold on the San Francisco Stock and Bond Exchange in the year 1912 was \$15,722,000 whereas the Pacific Gas and Electric Company in the same year, as shown on Page 14 of my former testimony in this matter, issued and sold bonds of the par value of \$25,000,000. Likewise during the five years from 1912, to 1916, inclusive, the aggregate of bond and stock sales listed in exhibit No. 101 as having been made on the San Francisco Stock and Bond Exchange amounted to \$86,930,650. During the same five years Pacific Gas and Electric Company, as shown on Page 14 of my former affidavit, issued and sold bonds, stocks and secured notes of the aggregate par value of \$59,709,500 the sales of Pacific Gas and Electric Company being equivalent to 66.6% of the total sales on the Exchange. The significance of this will be appreciated from the statement that one hundred and thirty different issues are listed on the San Francisco Stock and Bond Exchange, whereas Pacific Gas & Electric Company sales, above referred to, cover the distribution of only four different issues of securities. I can state from my experience that the bulk of the new capital required by utilities can be obtained only through recognized investment banking channels, namely, the sale at wholesale of securities to investment 1456 bankers and the payment of commissions for such service. In addition to this, utilities are required to pay other expenses incident to the issuance and sale of securities such as compensation to trustees under mortgages, fees of counsel, official fees re-

quired by the Public Utilities Act to be paid to the Railroad Commission of California, taxes, fees for listing stocks and bonds on the Exchanges, war stamp taxes, etc. Under ordinary conditions these expenditures will run from 5% to 10% or more of the par value of the securities sold. All of these expenses have to be met out of the rate of return.

The Pacific Gas & Electric Company, as referred to in my former testimony, has sold preferred stock direct to its customers, but that was rather an unusual way of going about it, and does not, I think, affect the statement I have just made, that in general the securities are sold through banking houses. It was a successful way of disposing of it—probably the only way we could have sold those securities at the time they were sold; but the money really was no cheaper to us, because we virtually gave the bankers' commission to the people who bought the preferred stock.

On pages 26, 27 and 28 of Exhibit 101 is shown the "Average Net Return on Bonds Listed and Sold on San Francisco Stock and Bond Exchange" during the year 1914. From this 1457 tabulation I have selected nine different bond issues, and with respect to these present some facts in addition to those shown in Exhibit No. 101. The choice of these nine issues was somewhat restricted through inability to secure the necessary data, but otherwise they were taken at random.

Percentage Earned by Various Companies on Par Value of Bonds Outstanding.

Name of company.	Par value of bonds outst'g Dec. 31, 1914.	Net earnings 1914.	Exhibit #101.				Source of information.
			% earned on bonds outst'g 1914.	Aver. rate (m't price).	Net inter- est rate.		
Associated Oil Company.....	\$15,212,000	\$4,081,929	26.8%	97.82	5.33%		Ann. Rep.
Calif. St. Cable R. R. Co.....	384,000	184,800	48.1%	100.00	5.00%		Walker
Calif. Tel. & Light Co.....	420,000	53,792	12.8%	100.00	6.00%		"
City Electric Co.....	1,979,000	330,310	16.7%	82.43	6.45%		"
Coast Counties L. & P. Co.....	1,639,000	162,634	10.0%	93.75	5.40%		"
Great Western Power Co.....	26,811,000	2,376,972	8.9%	79.57	6.55%		"
Los Angeles Gas & El. Co.....	8,636,000	1,834,221	21.1%	94.27	5.42%		"
Pacific Tel. & Tel. Co.....	41,375,000	4,825,432	11.6%	97.65	5.20%		"
Los Angeles Ry. Corp.....	*20,000,000	2,309,416	11.5%	91.46	5.62%		Moody

* June 30, 1914.

It will be noted from this table that in each instance the percentage earned by the issuing corporation on its outstanding bonds was greatly in excess of the "Net Interest Rate" which the purchaser of these bonds on the San Francisco Stock and Bond Exchange during the year 1914 was content to receive on his money.

In computing the percentage earned on bonds outstanding in 1914, I have divided the total net earnings by the total amount of outstanding bond issues including all bonds that each company had at that time, underlying issues, and divisional issues and junior issues. If it had been possible to get earnings segregated strictly according to the bond issues listed in Exhibit No. 101, those percentages undoubtedly in some cases would have been considerably higher.

There is no doubt in my mind that except for the "margin of safety" represented by the earnings in excess of bond interest, these bonds could either not have been sold at all on the San Francisco Stock and Bond Exchange, or would have had to be offered at materially lower prices to induce their purchase. In Defendants' Exhibit No. 101 the various bond issues are not described with sufficient definiteness to indicate in all cases whether they are underlying bonds, junior bond issues, divisional bonds or general lien bonds, or whether they are closed or open issues. In the tabulation submitted I have computed the average earnings on the par value of each corporation's total bonds outstanding at the close of 1914. It will be noted that the average sale price shown in Exhibit No. 101 does not in any case exceed par. If, therefore, the percentage earned on the outstanding bonds had been computed on the market value, instead of on the par value, the percentages earned would have been generally greater, and if the earnings available for the payment of interest on underlying issues could be ascertained the percentage earned on such underlying issues would be still larger.

In the tables of bond sales appearing in Exhibit No. 101 no attempt has been made to differentiate bonds of steam railroads, industrial corporations and public utilities other than steam railroads, nor between underlying bonds and junior bond issues, nor between so-called closed issues and open issues. Average "net interest rates" based upon the sales of such a heterogeneous mixture of securities are, in my judgment, subject to fluctuations through purely adventitious circumstances and therefore meaningless. It may well happen that in any one year there may be a preponderance of transactions in high grade underlying bonds, legal for the investments of savings banks and trust funds and sustained in a favorable market position by forced purchases for sinking funds, in which case the average "net interest rate" would be lower than if the bulk of the transactions happened to be in securities of an inferior quality. There is a vital distinction between so-called "closed issues" and "open issues." The term "closed issues" means that no more bonds may be issued under the terms of indentures securing such bonds. It follows that when the supply ceases the continual demand usually raises the level of prices of such bonds. The closing of a bond issue

also results almost invariably in increasing the safety of such bond issue by reason of the fact that the value of the property to
 1460 secure it is increased through the application of funds derived from the sale of stocks or bonds which are junior to the closed issue. There is no escape from the creation of such a condition when the utility operates in a growing territory and is alive to the obligations imposed upon it to serve the public.

In addition to the larger equity thus created for the holders of the "closed issue," the purchaser of such underlying closed issue also has the assurance that the obligation held by him must be protected by the owners of the junior obligations. As a means of raising new capital closed issues are of no benefit to the utility and the citation, therefore, of the market prices of closed bond issues, as indicative of the cost of money to utilities or as evidence that money in large amounts can be secured on approximately the terms indicated by the market quotations of closed bond issues, is illogical and without support in fact.

Using for the purpose of illustration the bond sales during the year 1914 as shown on pages 26, 27 and 28 of Exhibit No. 101, I call attention to the following issues of underlying bonds of the Pacific Gas & Electric Company, with the status of which I am personally familiar.

1461	Issue.	Net Interest rate.
	Bay Counties Power Company.....	4.97%
	California Central Gas and Electric Company.....	4.97%
	Edison Light and Power Company.....	5.15%
	Oakland Gas, Light & Heat Company.....	5.15%
	Pacific Gas Improvement Company.....	5.05%
	Sacramento Electric, Gas and Railway Company.....	4.90%
	United Gas and Electric Company.....	5.10%
	Valley Counties Power Company.....	4.97%

All of the foregoing bond issues were closed in the latter part of 1911 and during the past six years have afforded no means to the Pacific Gas and Electric Company for securing new capital. On the contrary, they have absorbed the Company's capital through obligatory purchases for sinking fund purposes. At the close of the year 1914 the total outstanding amount of underlying bond issues of the Pacific Gas and Electric Company, of which the foregoing are typical examples, was \$25,195,300 and these were followed by junior bond issues aggregating \$49,881,000. It is obvious from these figures that the above mentioned underlying bond issues are exceptionally well secured and involve a minimum of risk to the investor. That this is also the opinion of investors is shown by the low rate of return yielded on such purchases.

To illustrate the point made a little farther back:

1462 Of the \$5,974,000 par value of bonds sold on the San Francisco Stock and Bond Exchange during the year 1914, as shown on pages 26, 27 and 28 of Exhibit No. 101, \$1,095,000 par

value were bonds of underlying closed issues of the Pacific Gas and Electric Company, comprising more than 18% of the total sales. In the year 1915, of total sales of \$9,037,500 shown on pages 29, 30 and 31 of defendant's exhibit No. 101 \$1,931,000 or more than 20%, were of underlying closed bond issues of Pacific Gas and Electric Company.

That has appeared on the averages that have been computed in exhibit 101 for those various years, showing that every one of those averages contained a large proportion of closed, underlying issues that were selling to the investor at a comparatively low rate of return. There might have been other underlying bond issues included in the table upon which those averages were based, but I have no information except regarding the Pacific Gas & Electric Company issues.

It is a well known fact that investors will purchase the bonds of municipalities, such as those of the City and County of San Francisco, secured by the taxing power and occupying an exceptionally good position with respect to the availability of such bonds for investments of banks, trustees, etc., at prices which yield to them a less return than they are willing to accept upon securities of gas and electric companies. It is also a well known fact that investors 1463 will purchase bonds of well established steam railroads, such as the Southern Pacific Company, at prices which will yield them a smaller return than they are willing to accept upon the securities of gas and electric companies. That was undoubtedly true of the period in question. It is not quite so true today. The Presidential Message may, however, change it.

Referring to the statement of stock sales during the year 1914 shown on page 43 of defendant's exhibit No. 101:

Here again, in my judgment, comparisons are made between stocks that are totally unlike in character and representing investment hazards ranging from oil stocks to the stocks of large and well-established banks of national reputation such as stocks of the Anglo and London Paris Bank, Bank of California National Association, First National Bank of San Francisco and Savings Union Bank and Trust Company which are included in exhibit No. 101. The stocks of banks of this character are generally classed as gilt-edge investments, and they represent assets so liquid in their nature that the prices of the stocks are governed largely by the capital, surplus and undivided profits assignable to each share. In the report of the Comptroller of the Currency for the year 1914, it is shown on pages 396 and 397 of Volume II that the capital, surplus and undivided profits of the bank of California National Association averaged \$193.08 per share,

and of the Anglo London Paris National Bank \$139.10 per 1464 share. This compares with average market quotations of \$198.00 per share and \$145.50 per share respectively shown in Exhibit No. 101, and illustrates in a general way the statement just made. Bank stocks are also purchased by investors in the expectation that in addition to the dividends actually paid on the stocks owned by them, the so-called book values will also increase through the addition of undistributed profits, and that the earnings on this

additional capital will eventually result in higher dividends or in their being able to realize in the market for their stocks more than they paid for them.

On page 44 of Exhibit No. 101 Pacific Gas and Electric Company First Preferred Stock is shown as having been sold at an average per share of \$86.94, yielding a "net interest rate" of 5.19%. There is here an error in calculation, as the "net interest rate" on a 6% stock purchased at \$86.94 would be 6.9%.

On page 43 of exhibit No. 101 Giant Power Company, Consolidated, stock is shown as having paid 6% dividends in the year 1914, which at the sale price of \$82.62 per share yielded a "net interest rate" to the investor of 7.26%. In April, 1914, this company, in addition to its regular 6% dividends, distributed to its stockholders a dividend of 50% in stock and continued thereafter to pay 6% regularly on the increased capitalization.

On Page 44 of Exhibit No. 101 E. I. Du Pont de Nemours 1465 common stock is shown to have been sold at an average per share of \$313.17 and to have paid dividends at the rate of 8%, yielding a "net interest rate" to the investor of 2.55%. It is not clear from the description of this stock on page 44 whether the common stock of the E. I. Du Pont de Nemours Power Company or E. I. Du Pont de Nemours & Company was the stock dealt in. In "Moody's Analyses of Investments—Public Utilities and Industrials" on pages 1309 and 1310 of the edition for the year 1917, the following information respecting these two common stocks of the Powder Company is given—I have quoted the information in full:

"E. I. De Pont de Nemours Powder Company common stock:

"Authorized \$35,000,000 common. Par \$100. Common stock is entitled exclusively to all dividends in excess of 5% per annum paid to preferred stockholders; it will also receive in liquidation all assets after paying to bonds and preferred holders the par value of their holdings. Dividend payments on common have been made quarterly March 15th, as follows: 1½% Dec. 15, 1904; 3½% in 1905; 6½% in 1906; 7% in 1907 and 1908; 7¾% in 1909; 12% in 1910, (including 4% extra in Sept.); 12% each in 1911 and 1912 (8% regular and 1% extra quarterly); 1913 and 1914, 2% quarterly; March 15, 1915, 3%; June 15, 4% and 5% extra paid in Atlas Power Co. preferred stock; Sept. 15; 10% in cash. Since the reincorporation this stock remains outstanding and receives the same dividend as No. 3—debenture stock—(i. e., 6% per annum, 1466 payable quarterly, Jan. 1)."

"E. I. Du Pont de Nemours & Co. common stock:

"Authorized, \$80,000,000; outstanding Dec. 31, 1916, \$58,854,200; par \$100. Issued to the old common stockholders of the E. I. Du Pont de Nemours Powder Co. as a 200% dividend in Oct. 1915. Stockholders were allowed to retain their old common stock, which now receives the same dividend as the debenture stock. Dividend paid: Dec. 15, 1915, 30% cash; March 15, 1916, 5% cash and 19% in Anglo French 5s; June 15, 1916, 5.8% cash and 19.2% in Anglo

French 5s; Sept. 15, 1916, $5\frac{1}{2}\%$ cash and $19\frac{1}{2}\%$ in Anglo French 5s; Dec. 15, 1916, 26% cash; March, 1917, $4\frac{1}{2}\%$."

"Moody's Analyses of Investments" is a standard publication and is generally accepted as accurate by bankers, brokers and investors, and it would appear from the foregoing statements that the common stock of the E. I. Du Pont de Nemours Powder Company received in the year 1915 17% in cash dividends, 5% dividends in Atlas Powder Company preferred stock and 200% in common stock of E. I. Du Pont de Nemours & Co., a total of 222% . Also that the common stock of E. I. Du Pont de Nemours & Co., if that be the stock referred to in exhibit No. 101, received in the year 1915 30% in cash dividends."

From the table on Page 43 of Exhibit No. 101, showing sales of stock on the San Francisco Stock and Bond Exchange in the year

1914, I have selected twelve of the issues, being all shown on 1467 that page except four bank stocks, a powder stock, Armsby &

Co. stock and the Spring Valley Water Company stock; the earnings of Armsby & Co. not being available, and the market price of Spring Valley Water Co. stock during the year 1914 having, in my judgment, been influenced more by negotiations then in progress with the City and County of San Francisco than by the return yielded at the rate of dividends current that year. The attached statement gives, in addition to the "net interest rate" shown on page 43 of exhibit No. 101, the per cent. earned on the par value of the stocks.

Percentage Earned by Various Companies on Par Value of Stocks.

Name of company.	Par value stock outstanding.	Net earnings available for dividends.	% earned on par value of stock.	Dividends paid.	Net interest rate, Ex- hibit No. 101.
Pacific Lighting Corp. Pref.....	\$4,162,000	\$573,200	13.7%	5.0%	6.72%
" " Common.....	4,800,000	365,100	7.8%	8.0%	8.17%
Fireman's Fund Ins. Co.....	1,500,000	787,454	52.5%	16.0%	6.80%
Calif. Street Cable R. R. Co.....	1,000,000	136,001	13.6%	7.2%	6.00%
Amalgamated Oil Co.....	5,000,000	526,597	10.5%	15.0%	18.71%
Associated Oil Co.....	39,758,462	1,264,752	3.1%	3.0%	7.53%
Alaska Packers Association.....	5,750,800	789,689	13.7%	6.0%	7.93%
California Fruit Cannery Ass.....	3,000,000	803,051	20.1%	7.2%	6.27%
California Wine Assn. Common.....	4,754,200	446,481	9.2%	5.0%	10.17%
California Wine Assn. Pref.....	1,426,260	532,057	37.3%	6.0%	8.0%
Pacific Tel. & Tel. Co. Pref.....	32,000,000	2,260,175	7.1%	6.0%	6.74%
Philippine Tel. & Tel. Corp.....	493,680	50,983	10.3%	8.0%	8.02%

1468 It will be noted from this statement that, with one exception, the percent. earned by these corporations on the par value of their stocks exceeded the dividend rate, and quite substantially so with this one exception. I have also compiled a similar statement comparing the percent. earned by these companies on the market values of their stocks with the "net interest rate" yielded to the investor on these market values. The market values used by me in this compilation are those shown in Exhibit No. 101.

Comparison of Per Cent Earned by Companies on Market Value of Stocks With "Net Interest Rate" to Investors Based on Market Values of Stocks as Shown in Defendants' Exhibit No. 101.

Name of company.	Per cent earned by company on market value of stock.	"Net interest rate" shown in Defendants' Exhibit No. 101.
Pacific Lighting Corp. Pref.....	18.4%	6.72%
" " " Common.....	8.0%	8.17%
Fireman's Fund Ins. Co.....	22.3%	6.80%
California St. Cable R. R. Co.....	11.3%	6.00%
Amalgamated Oil Co.....	13.1%	18.71%
Associated Oil Co.....	7.8%	7.53%
Alaska Packers Association.....	18.1%	7.93%
California Fruit Cannerns Assn.....	17.5%	6.27%
" " Wine Association Preferred.....	49.7%	8.0 %
Common.....	18.7%	10.17%
Pacific Tel. & Tel. Co. Pref.....	8.0%	6.74%
Philippine Tel. & Tel. Co.....	10.0%	8.02%

1469 In the second table submitted, headed "Percentage earned by various companies on par value of stocks, Pacific Lighting Corporation" is shown as having paid 8% dividend and having earned on the par value of their stock only 7.8%. The Pacific Lighting Corporation is a holding Company; it has nothing more than an office, and owns all of the stock of the Los Angeles Gas & Electric Corporation, and it is quite customary for holding companies of that character to simply draw from the operating company such amount as they need to pay their small expenses, their charges and dividends. I don't know that that was done by the Pacific Lighting Corporation. But this statement covers only the year 1914. If the earnings for other years covered by this litigation be taken we find in Moody's Analyses of Investments that in 1912 the Pacific Lighting Corporation earned 11.8% on its common stock, in 1913 11.8%, in 1915 9.8%—I guess I dare not go farther, but it just so happened that in the years I selected there was one in which the earnings were lower than in either the following year or the preceding year. There is one other company in the same statement shown as having—the Amalgamated Oil Company is shown as having paid out in dividends more than it earned; both with respect to the Amalgamated Oil Company and the Associated Oil Company,

I believe people bought the stock of such companies because of the speculative possibilities. I can speak from personal knowl-
 1470 edge about Associated Oil, because I bought some of that four or five years ago, and I did not buy it for the dividends, but with the expectation that the market price would increase, and that I would make a profit in that way. I wish to make one further statement about bonds dealt in on the exchange, as to the influence on quotations of purchases by the companies themselves for sinking fund or other purposes. On Page 26 of Exhibit No. 101 Associated Oil Company 5% bonds are shown to have sold at an average rate of 97.82, netting the investor at this price 5.33% per annum. Similarly, on page 29 these bonds are shown to have sold at an average rate of 98.21, netting the investor 5.30% per annum. The annual reports of the Associated Oil Company show that at the close of 1913 it had outstanding \$13,641,000 First Refunding 5% Bonds, and "on January 15, 1915, trustee purchased and canceled from sinking funds provided during the year First Refunding Bonds aggregating \$1,113,000," and during 1915 "the company purchased \$1,737,000 of First Refunding Mortgage 5% Gold Bonds which it holds in its treasury." In other words, in two years' time this company purchased for sinking fund purposes \$2,850,000 par value of First Refunding Bonds, or more than one-fifth of the entire outstanding issue. It is, I believe, an obvious conclusion that these large purchases materially strengthened the price of these bonds, and that the "net interest rate" in this particular instance is more
 1471 a reflection of the price the oil company was willing to pay to retire its own obligations than a measure of the value placed upon them by investors, and still less an indication of the cost of capital to a public utility.

On cross-examination the witness testified in substance as follows:

In compiling the last table contained in the statement which I have just read, I divided the net earnings of each company remaining after payment of bond interest by the market value of its outstanding stock for the purpose of ascertaining what percent its earnings were of such market value. Net earnings after bond interest are all that are available for dividends on stock. The data used in compiling that table were taken from the published reports of the companies as given to the public and to investors generally through such mediums as Moody's Manual and Walker's Manual of California. I do not dispute Mr. Boston's statement as to the dividends actually paid by these companies. In preparing these tables it was my purpose to show that, while the companies mentioned by Mr. Boston might be paying dividends at the rate of 5% or 6% or 7%, they were actually earning more money than they were paying out in dividends. In the case of these companies, there was a
 1472 margin of safety for their stock. The variation in the net interest rate in the case of stock as shown in Exhibit No. 101 does not appear to have any definite relation to the variation in the amount of net earnings. The reason for that fact I have ex-

plained in connection with my discussion of the sales of bonds and that explanation applies in part to corporate stock.

There are many factors besides net earnings which affect the market value of the stock of corporations. For instance, the Fireman's Fund Insurance Company is engaged in the business of marine and fire insurance which is a more or less hazardous business. That may account for the fact that that company's stock sold on the basis of 6.8% return although its net earnings amounted to 22.3% of its market value.

In presenting the statement which I have just read, one of my purposes was to show that the "net interest rate" shown in Exhibit No. 101 does not really mean anything as far as the rate of return is concerned and that the percentage earned by the corporations on their securities does mean something—it means more than the "net interest rate."

During the years involved in this litigation the net earnings of the Pacific Gas and Electric Company available for dividends on common stock was a little over 8% of its market value. The market price of the Pacific Gas and Electric Company's stock fluctuated and I cannot give you the exact figures. My impression is that the average market price of the Pacific Gas and Electric Company's common stock during 1916 was between \$55.00 and \$60.00 per share and during that time it paid dividends on its common stock at the rate of 5% per annum.

A very considerable part (in round figures, \$25,000,000.00) of the capital invested in the Pacific Gas and Electric Company's properties is represented by closed bond issues. In my opinion, the price at which the bonds of a closed issue sell in the market has no bearing at all on the rate of return which a public utility ought to be allowed to earn. The money obtained through the original issuance of bonds may have cost the issuing company 6 or 7% and yet these bonds may subsequently, when the issue is closed, be sold on the basis of a 5% return to the purchaser. When a bond issue secured by a prior mortgage is closed and subsequently a bond issue secured by a so-called "refunding mortgage" or other junior lien is resorted to for the purpose of procuring additional capital, those who have invested their money in the first issue get the benefit of the increased security while the company issuing the bonds has to obtain new money which it requires by the sale of its junior lien bonds. This goes to show that the cost of money to the company is more than is indicated by stock exchange transactions.

NOTE.—The evidence relating to the rate of return which plaintiff was entitled to earn upon the value of its gas properties is reviewed by the Master on pages 111-129 of his report.

1474

SUBDIVISION VI.

Evidence Relating to Value of and Compensation for Management

Mr. C. E. GRUNSKY, a witness called for the plaintiff, testified with reference to the value of management and the right of a public utility company to receive compensation for management as follows:

Mr. Bosley:

Q. Mr. Grunsky, will you state whether or not a public-utility company, under existing conditions, does anything further than to place its public-utility property at the service of the community which it furnishes with service or with a commodity of general use?

A. It does. It places at the disposal of the public and serves the public with an organization. There is management of every public utility involved, and the owner of the public utility is entitled to compensation for such management.

Mr. Bosley:

Q. Will you go on now and express your opinion concern-
1475 ing the consideration that should be given from the point of view of the economist to this additional service that is rendered by a public utility, that is, a service that is rendered over and above the placing of its property at the service of the community which it supplies with a commodity or with service.

A. I would say, in relation to this matter that all rate regulating authorities are devoting much thought and study to the establishment of a proper basis of calculation when the rates to be charged by public utilities are to be fixed.

The highest court has said that value must be the starting point and the attempt is therefore generally made to comply with this apparent requirement of the court. The result is the use of a rate base conforming to "present value" or to something that may be called present value even though in making value the rate base it is occasionally found necessary to read new meanings into the word value. After this value has been ascertained in some fashion the owner of the utility is allowed to earn a return thereon, usually somewhat in excess of what would be a fair interest return on money for investment in enterprises of like character.

When there is included in the rate base, thus established, an allowance for "going value," the interest return allowed and earned on this "going value," together with earnings to cover the excess of
1476 the return rate over the ordinary interest rate, is the owner's compensation for hazards and for management and may also cover some participation in the prosperity and increasing values of the property in the community which is served by the utility. If the allowance for hazards has been correctly estimated, the owner will in the long run get little or no advantage therefrom,

because this allowance will be offset from time to time by losses or sacrifices of various kinds. The allowance for participation in the general prosperity is not always recognized as being due to the owner for the reason that a part thereof, under the prevailing system of using value as the basis of the calculation, makes its appearance in the increase of real estate values and in the increasing values resulting from the gradual but recognized rise in the price of materials and the rise in the wage scale. And yet, every utility helps to create the general prosperity. It adds to the unearned increment of the vacant lot and unused field as well as to that of the lot or field whose owner is a rate-payer. Some portion of this prosperity should go to the utility, even when its property items do not include appreciating real estate. But, even when the earnings cover fair allowances for hazard and for the unearned increment, the obligation of the public to the owner of the utility is not yet fully discharged. There should be proper compensation for management. It is not enough to allow the bare salaries of those who are entrusted with the management and operation. The owner is entitled to something more. He has

brought into being and has placed at the service of the community an effective organization the stability and efficiency of which is guaranteed, as in the case of a corporation owner, by the character, judgment and business experience of a board of directors selected by the stockholders. The existence of the corporation, the business ability of its directors resulting in the energetic control of its affairs, the cash contribution by stockholders, the successful operation of the enterprise, or, in the case of the new venture, the implied guarantee of success, affords the basis for making loans and extends the ability of the public to enjoy transportation facilities or electric service, or gas and water supplies that might otherwise long be out of reach by reason of the limited borrowing capacity and lack of business ability of municipal organizations. The owner should be fully compensated for the service rendered. The mere payment of salaries to those who are actively engaged in the management is not full compensation for this service. The compensation for management even though not usually specifically referred to or separated from what might be called broadly, the profit allowance, makes its appearance as a part of the excess of earnings above the actual cost of money (interest with due regard to discounts and commissions after allowing for operating expenses and replacement requirements.

That there should be something in the earnings as compensation for management can hardly be questioned. There will, however, be difficulty in bringing the same into a satisfactory relation to the rate base. This is equally true of the allowance which should be made for the participation in the general prosperity and is true to a less extent of the hazard allowance. All of these elements, which should be covered in the earnings, are more closely related to the volume of business than to the capital invested in the enterprise, or to any rate base built up from "value."

It happens occasionally that a public utility concern does a large

volume of business on a small investment. Some of the express companies belong in this class. The case may readily be conceived of such a concern which rents its office facilities and operates under contract with railroad and steamship companies, and which outside of its trucks and other vehicles for local delivery, has made no investment of any moment. It would be in vain in such a case to attempt a regulation of rates based solely upon a fair return upon the invested capital. The whole field must be brought into view. The volume of business transacted is, in such a case, equally as important an element for consideration as is a rate base when a limit is to be set upon the earnings.

An express company, as here assumed, has no appreciating property. Its share in the unearned increment of the country should be brought into some relation to the amount of service which it renders, that is, to the volume of its business.

The compensation for management likewise is intimately related to and should be figured with the volume of business as the starting point.

1479 It would, of course, be quite as feasible to start with the total cost of operation instead of with the gross annual receipts when determining what should be allowed for management and what should be allowed to cover participation in general prosperity, but the gross income as a basis has obvious advantages. Bookkeeping will be simplified and the control is more readily effected. The annual cost of operation will be more difficult to ascertain and will show greater relative fluctuations than the annual gross income, and for the same allowance in the earnings, the per cent of the annual gross income will be less than the per cent of the operating cost, thus resulting in greater stability of the percentage allowance when once fixed.

Mr. Searls:

Q. It is not clear to me what this percentage allowance is for. Is it a compensation for management allowance that you are talking about?

A. I am talking here of the allowance of compensation for management, and the participation in the general prosperity and an allowance for hazards.

Q. And you are attempting to get a basis for figuring a separate percentage to be allowed the company for that?

A. I am simply stating that if such an allowance is made and brought into some relation to the total volume of business, it would be expressed in a percentage allowance.

Mr. Bosley: Mr. Grunsky is not attempting to work out what any such percentage should be.

1480 Mr. Searls: It is not clear to me whether he thinks something should be added to his rating base for that, or should be added to gross income, or what it is.

A. (Continuing:) I am trying to make clear that the allowance should be an income, and that the amount of the allowance should be predicated and based upon the gross annual income rather than upon a rating base.

From the standpoint of the public, there can be but little question that the compensation for management should, as here suggested, be brought into fair relation to the volume of business instead of making its appearance in the interest allowance on an arbitrarily established or assumed "going value." No basis has yet been discovered for establishing "going value" except capitalization of net profits. When, therefore, "going value" deduced from the opinion of experts supported chiefly by assumptions, as distinguished from cost of developing business, is included in a rate base, the procedure must appear illogical to the rate payer and will always remain subject to attack, both as to principle and amount. The alternative procedure, which is now suggested, but which is novel and is here perhaps for the first time brought to the attention of a court, should appeal to all concerned as logical and in accord with the common practice in ordinary business affairs, of allowing commissions based on the magnitude of the involved transaction.

To summarize: No argument seems to be required to prove the owner's right to compensation for management.

1481 This compensation cannot be brought into any definite or satisfactory relation to what I believe should be designated as the natural rate base, which is the legitimate investment, usually determined from cost of reproduction, including an allowance for cost of developing business, but without deduction of depreciation, because the amount of business bears no definite relation to the amount of capital invested.

If this compensation is brought into some relation to value, (including in value the going value of the concern) then, the reasoning will be in a circle and the proceeding will be illogical and absurd.

It will always be fair to both the owner and the rate payer to let this compensation be brought into a proper relation to the gross income.

The owner's share in the general prosperity of the community, under the customary procedure of the rate regulating authorities, is recognized in those cases in which the utility plant includes property which is appreciating in value. There may be some unearned increment, in addition thereto, concealed in the allowance for "going value" and in a rate of return in excess of the cost of borrowed money, but so long as one concern gets the unearned increment in large amount due to increasing values of real estate and other concerns apparently get none, the system will be at fault. The participation in general prosperity should therefore, also, be brought into relation to the volume of business, and not to a rate base.

1482 The business hazard is contingent in part on the amount of capital which the owner has invested, and in part on the cost of operation. The allowance for hazard if considered apart from obsolescence and from losses due to fortuitous events, which

should ultimately fall on the public and not on the owner, will ordinarily be small and, if expressed in figures at all, can be readily brought into relation to the volume of business. It is not logical to bring it into relation to value which may be made up largely of intangibles. It is not logical either to bring it into definite relation to the natural rate base. Hazard, too, therefore, had best be brought into some relation to the volume of business.

1483 Mr. JAMES T. RYAN, who had previously qualified as a valuation engineer, and had testified with reference to going concern value, was recalled as a witness for the plaintiff, September 26, 1917, and testified in substance as follows:

I have been almost continuously engaged since the latter part of May in this year, in making a study of the cost of management and of its value in connection with the service rendered to the public by public utility companies. I have prepared a statement setting forth the results of my investigation and my conclusions based thereon. This statement is as follows:

I have been employed since July, 1910, in the valuation of public utilities, the work involving the study of development costs, the appraisal of so-called intangibles, and making economic studies in rate cases in addition to the valuation of purely physical structures. Within the scope of such studies considerable attention has necessarily been paid to the organization of the administrative staffs of the utilities appraised, and the cost of management incurred by these utilities in developing and rendering the service they supply to the public. Among the properties so studied in the State of California are:

The San Joaquin Light and Power Corporation,
Pacific Light and Power Corporation,
1484 Southern California Edison Company,
Western States Gas and Electric Company,
Pacific Gas and Electric Company,
Southern California Gas Company,
Santa Barbara Gas and Electric Company,
Northern California Power Company,
Marin Water and Power Company,
Western Water Company,
California Telephone and Light Company,
Livermore Water and Power Company.

Some of these investigations have been more thorough than others, but in nearly all cases have included an analysis of administration and general expenses, and a study of their relation to the revenues, business and property of the enterprise.

Since being assigned to the presentation of the present case, I have made a further review of the same data, with particular reference to general and administrative expense, and have examined books, records and reports of other utilities reporting to the Railroad Commission of the State of California, and of the utilities forming

groups operated under the general supervision of the J. G. White Companies of New York, of H. H. Byllesby Company of Chicago, the Middle West Utilities Company of Chicago, and the Commonwealth Edison Company of Chicago.

Operating statistics of these companies have been examined in detail, and the results compared with the same data arising from the operations of the companies which I have studied in California, and in general with data taken from reports of other California utilities filed with the Railroad Commission.

Management, Organization and Methods.

Virtually all public utilities in California are owned by organizations created under the corporation laws of the State and are operated by boards of directors composed of and selected by stockholders for that purpose, whose compensation is usually nominal. Most of these utilities have been financed in part by the stockholders and in part by money borrowed by them, which is usually represented in the capitalization by some of the various forms of secured obligations. The position of the stockholder is, therefore, very different from that of the secured creditor. Both are investors, but the stockholders must, in addition, assume responsibility for the success of the venture and for the payment of its debts. They must not only invest money, but must organize, develop and manage the business in which their capital is invested. They must, in the beginning select a board of directors, and through the agency of this board consider and approve the design, purchase and installation of plant facilities, select, employ and coordinate an executive and administrative staff, effect arrangements for financing, formulate a business policy, and undertake the responsibility for service which the utility laws impress upon them.

These duties exact from them and their board of directors a high degree of intelligence and business acumen, much energy and time, and demand their continued attention throughout. The investment of their capital and the managerial work required to make the enterprise a success and their holdings safe are closely associated, and their services are generally regarded as incidental to the investment, largely because their entire return for the services which they render and for the use of the capital which they invest is paid to them in the form of dividends on the stock held by them. The accounts analyzed as the basis for this presentation include all charges arising from salaries paid to executive officers and employees of the respective utilities, but contain no entries showing the value, extent, character, or even the fact, of services rendered by stockholders and their board of directors, beyond the nominal meeting-day fee paid to the latter. It is obvious, therefore, that dividends do not represent solely a profit on investment, and that the operating charges do not fully cover payment for all services rendered to the enterprise by its management. These services, however, are real and constitute an essential factor of the organization and management of utility enterprises. The men who

render such services receive, although indirectly in the form of dividends if the earnings are adequate, compensation for them, and this compensation can only be paid by the utilities from their earnings, and such payments must be considered in no other light than a factor in the cost of utility service.

In most of the older utilities of the State the promoters have
 1487 given shares of stock in the properties to the attorneys, engineers, financiers and officers as part compensation for their services. Such shares are not issued for capital invested, but represent a share in that investment and a portion of profits, yet to be made, which the owners are willing to divide with those whose services are expected to make the venture profitable. Dividends on stock so issued are not a return on invested capital, but a payment for services not carried as an operating expense, and where it is desirable, or has become a matter of public policy, to limit compensation for the use of capital to the money invested, fair and just consideration must be accorded to the labor, energy and credit necessary to create the property and maintain the service it is designed to render.

The money invested in the property of a utility is not the only value involved in the service it renders, and it takes more than capital to create this service. Money is inert, and alone can create, can develop nothing. The stockholders of a successful utility have done more than place their capital at the service of the public. They have selected from their membership a board of directors whose work has been an indispensable factor in attaining this result. Their genius for organization, for discovering and developing administrative ability and technical skill, has been employed to secure a staff of executive, legal, engineering and commercial experts, and has trained and coordinated their energies into a definite
 1488 program of public service. Equipment of complicated and intricate nature has been invented, perfected and placed in efficient operation. These are far more difficult tasks than that of securing money, and should be recognized accordingly. Ability, specialized experience and technical skill cannot, like money, be secured in the open market; ability must be discovered and specialized experience and technical skill created through long period of training and educational development largely within the organization that requires them. Rarely does a successful enterprise go outside of its ranks for men to fill vacancies in its executive staff after it has become fully established. When such vacancies occur, there is no time to experiment with untried or unknown men—the service must go on. Subordinate employes, often without knowing it, are constantly subjected to educational processes to qualify them for duties and responsibilities beyond their present vision, and when vacancies occur or emergencies arise there must always be some one fully prepared for the occasion.

If the investment return is to be limited to an interest rate on the value of the property devoted to utility service, it is both right and proper to ascertain the value of the managerial services generally identified with the ownership, and to award a fair compensation for

them in addition to the expenses carried on the books as operating charges, even though this compensation is distributed in the form of dividends instead of salaries. This determination involves the analysis of managerial methods of utilities in general and a careful
 1489 comparison of the costs incurred by them with those of the Pacific Gas and Electric Company.

There are four general types of administrative organizations employed in American utility practice at present, as follows:

1st—The Isolated Plant.

An enterprise providing a single or combined service to a single community, under local management and control.

2nd—The Management Group.

A series of isolated plants under separate ownership who have employed a professional management enterprise to administer the properties.

3rd—The Holding Company Group.

An isolated plant, or a series of them, separately incorporated and with subordinate local management, the stock being owned or controlled by a holding company which finances, manages and shapes the policy of all.

4th—The Public Utility System.

A series of isolated plants coordinated into a system, held in absolute ownership by one company and managed directly by a centralized organization.

In the first type all administrative charges arise from expenses incurred by an organization directly associated with the business of the utility, and there is a direct relation between the expense and the service benefited. Enterprises so managed are usually found
 1490 in the more isolated communities of the interior, and having only a small organization, are almost always compelled to employ outside expert assistance when unusual construction work, rate controversies, additional financing, or other special problems arise, and the cost, usually large because based on casual employment, is added to their regular expenditures as an additional administrative expense. In each case the accounts of the utility represent the cost of administration as directly incurred, there being no indirect or joint charges segregated on an arbitrary basis against the service. Managerial work done by the board of directors as an incident to their investment does not appear in these charges, and is compensated for in dividends. There are about 280 utilities so managed in the State of California.

The second type is usually found where a utility has been financed by outside capital, and having no responsible interest in its stock held

by local people, a professional management organization has been employed to direct its policy, take the responsibility of conserving its assets and developing its business and furnish or employ expert engineering, legal, financial and accounting assistance, as required, for a fee usually fixed in proportion to its volume of business, or as a direct percentage of its gross earnings. These management concerns have built up an extensive business among Eastern utilities, but are little known on the Pacific Coast. The results of operation under this form of management have in many cases been highly gratifying, as operating details have been standardized, the service materially improved and extended, the purchase of materials effected at lowered cost, and the cost of management and professional services greatly reduced. As in the previous type, some management services are incidental to the investment and do not appear on the operating charges.

The cost of administration of the third type is more difficult to analyze with accuracy, because in many cases the holding company owns all the stock of its subsidiaries, and is indifferent whether its investment return, its managerial compensation and its profits are combined in the form of dividends or are segregated. The former method is generally followed, and in many cases where a segregation of cost is attempted, the holding company's primary concern being the profitableness of its investment, the cost of management is charged against its own revenues and the charges for management made directly against its subsidiaries are only nominal. Holding companies are sometimes in a position to realize profits through the financing of their subsidiaries, and through the purchase and sale of utilities and their securities. In many cases they allow earnings to accumulate, and while no dividends are declared and little or no managerial compensation exacted, large profits may be realized through the enhanced earning capacity of the property afterwards. On account of these conditions and the difficulty of getting exact information as to the operations of the parent organizations, the average or extremes of cost of management by holding companies cannot be definitely stated.

The highest development of American public utility service, the greatest efficiency, and the least expensive management are found in the fourth type, the public utility system. The magnitude of the operations of a large system makes possible a departmental organization and specialization of duties and responsibilities beyond the reach of isolated enterprises, and enables the management permanently to use the services of trained experts which the smaller concern must employ, if at all, sparingly and at high per diem rates. This permanently employed staff, guided by the results of experience and research, and mindful of future requirements as well as of present necessities, renders possible the coordination of their energies into a definite plan of development and enables the enterprise to anticipate conditions before they arise, and by doing so, standardize service and stabilize rates to an extent not possible to a smaller concern. The experience of the individual becomes an asset of value to the organization as a whole, and his services are far more effective

than those obtained by the occasional employment of the expert in general practice.

In many ways the methods followed are similar to those employed by the management group, but are employed with greater efficiency and at less cost. A management group could be consolidated into a public utility system with but little change in departmental organizations, but the engineering, accounting, auditing, legal and financing operations would be simplified, details eliminated and the costs greatly reduced. The public utility system organization is impossible, however, in many cases where, like most of the New England states, the utility, if a corporation, is required by law to have a State Charter and to maintain its principal offices within the State.

In the management group and the holding company, the individual utility, either as a fee or in the form of dividends, is expected to pay to the organization that manages it sufficient compensation to provide a fair margin of profit. This profit, as distinguished from actual cost incurred in management, may be deferred during the development period, and in individual cases may never be realized, but the success and prosperity of a large number of such enterprises indicates that the field has been a fertile one. The charges made for management have been reviewed by State regulatory commissions in numerous cases and have generally been approved, as for example, the Byllesby Company's charge against the San Diego Consolidated Gas and Electric Company, C. R. C. Decision No. 3839; Re Colorado Springs Light, Heat and Power Company, P. U. R. 1916—C. P. 489; Bogard vs. Wisconsin Tel. Co., P. U. R. 1916—C. P. 1046; Re Chesapeake & P. Tel. Co., P. U. R. 1916—C. P. 994; Re Mountain States Tel. & Tel. Co., P. U. R. 1917—B. P. 289.

These decisions are based upon the showing made in each case that the value of the service rendered makes the charge, irrespective of cost, a reasonable and proper operating expense.

Comparisons of Cost of Management:

The Report of the Railroad Commission of the State of California for 1916 contains abstracts of the financial reports of 316 utilities for the calendar year 1915. As these utilities are operated under classifications of accounts prescribed by the Commission, it is presumed that the data shown is reasonably comparable. Taking all the gas, electric and water utilities, irrespective of size and managerial methods, the ratio of administration costs to gross revenues for 1915 was as follows:

	Gross earnings.	General & admin. expense.	Ratio.
66 Electric Companies.....	\$33,469,259	\$1,969,144	5.9%
49 Gas Companies.....	15,078,240	886,630	5.9%
201 Water Companies.....	9,725,337	1,234,731	12.7%
Totals	58,272,836	4,090,505	7.02
Totals, Excl. P. G. & E. Co.	39,669,388	3,314,444	8.35%

Of these utilities, 280, or approximately 90% of the total, are operated as isolated plants. Their earnings, however, are less than 25% of the total. There are seventeen public utility systems and nine isolated plants with earnings in excess of \$100,000 annually. Arranging these utilities in groups, the ratio of general expense to gross earnings for the year 1915 appears as follows:

	Gross earnings.	General & admin. expense.	Ratio.
1495 9 Large Isolated Plants	\$6,423,256	\$616,934	9.6%
270 Small Isolated Plants . . .	7,632,849	941,147	12.1%
16 Public Utility Systems (P. G. & E. Co. omitted) .	18,990,017	1,456,632	7.7%
Pacific Gas & Electric Co. . . .	18,603,458	776,061	4.2%

If the San Francisco gas properties were operated as a strictly local enterprise, with none of the efficiencies resultant from its association with the system with which it is now identified, the administrative and general expense items of operating cost could hardly be less than eight per cent, and might reasonably reach ten per cent, of its gross earnings, and consequently would be between \$325,000 and \$400,000 annually, or from \$160,000 to \$240,000 more than the charges now made in the company's accounts, as shown in Plaintiff's Exhibit No. 19.

But these large sums are not the only savings effected by the managerial organization of the company. There are obvious economies made in every branch of operations due to the magnitude of its business and the diversity of its activities. In the purchase of materials, the construction of plant additions, the financing of new capital issues and the conduct of litigation there is a substantial saving over the relative costs incurred by isolated enterprises. In a small plant when equipment becomes inadequate it must be discarded and can rarely be sold for more than junk; in the large system it is possible in most cases to find a district to which it can be transferred and continued in use throughout its efficient life. The standard-
1496 ization of methods and processes, and stabilizing of rates and service is effected to a far greater degree than possible to the small enterprise.

The average cost of administration of several groups of utilities operated by management organizations, including the H. H. Byllesby properties in California, is approximately 8½% of the gross earnings, about two-fifths of which is paid to the management enterprise. If the San Francisco gas properties were so operated, the cost of management would be approximately \$340,000, or about \$180,000 more than the charges now made by the Pacific Gas and Electric Company.

Conclusions:

The general and administrative expenses of California utilities locally owned and operated as isolated enterprises average about 12% of their annual gross earnings. Such expenditures have been

recognized as reasonable and fair in numerous rate determinations by the State Railroad Commission. The charges made by management corporations and holding companies for administration, in addition to the direct charges of utilities so managed, range from three to five per cent of annual gross earnings. Such charges have been approved as reasonable and fair in rate determinations in this and other states, and the service thus rendered and paid for characterized as advantageous to the public and the utility.

Measured by the experience of other utilities, the value of the service rendered by Pacific Gas and Electric Company in the management of the San Francisco gas properties and business is not less than 8 per cent of the gross annual earnings of that property, and if operated as an isolated plant, would cost not less than 10 per cent of annual gross earnings if the present efficiency and standards of service were maintained. Based upon these considerations, I estimate the value of the administrative and managerial services rendered to the San Francisco gas district by the stockholders, directors and officers of the Company, of which only a part appears as operating charges on the books of the Company, for each of the three years in litigation, to be as follows:

	Gross earnings.	General & adm. expense.	
		%.	Amount.
1913-14	\$3,689,858	8½	\$313,638
1914-15	3,997,139	8½	339,756
1915-16	4,163,065	8½	353,861

The portion of general and administrative expenses actually carried on the books and segregated to the San Francisco District, gas department, as shown in Plaintiff's Exhibit No. 19, for the same periods, is as follows:

1913-14	\$162,382
1914-15	177,437
1915-16	157,384

Deducting these sums from the amounts estimated as a proper charge for the corresponding years, I find the additional charges necessary to bring book entries up to figures that will represent the proper value of all the services rendered in the management of the property, for the three fiscal years in litigation, to be as follows:

1913-14	\$151,256
1914-15	162,319
1915-16	196,477

While these sums, considered by themselves, appear large, their ratio to gross earnings (4½%) and to capital invested in physical

property (approximately 1%) is very low. If the property were operated under any other form of organization and management the expenditure would be much greater. The amounts are proper charges against the consumers supplied by the Company because they represent the value of services actually rendered, and because these services have been the means of effecting economies in operation far in excess of the value placed upon them. Perhaps the most striking, but by no means the most important, example of saving so effected was that involved in selling the first preferred stock issue marketed during the period in litigation.

The Company had sold \$20,000,000 in par value of general refunding bonds during 1911, on which the marketing agencies realized commissions amounting to $7\frac{1}{2}\%$ of par value. At the time the preferred stock was issued, it had under consideration an offer of a responsible financial concern to market an issue of \$12,500,000 of ten-year debentures for commissions ranging from 5% to $7\frac{1}{2}\%$ of their par value. It is obvious, from these facts, that the management, in selling the preferred stock with its own organization, effected a saving of the difference between the actual costs of 1499 selling and a commission of 5% on par value of the shares sold.

Up to December 31, 1916, 137,095 shares were sold, with a par value of \$13,709,500. At 5% of par value the commissions would have amounted to \$685,475, to which should be added attorney's fees of not less than \$25,000, making the total cost of marketing this issue through the usual channels of not less than \$710,475. The actual cost was \$134,925.26, and represents a saving of \$575,550 over the lowest possible cost through any other procedure.

The witness having concluded the reading of his statement, testified further in response to questions by counsel for plaintiff, as follows:

There are many other instances to which I could refer as illustrations of the fact that savings have been effected in the operation of the plaintiff's gas properties and business in San Francisco as a result of that business being conducted in connection with other branches of the plaintiff's business under the management of its executive officers and the heads of its several departments. The saving in the cost of manufacturing gas, attributable to the invention and installation of the gas generators invented and designed by Mr. E. C. Jones, is in part due to the fact that the plaintiff's San Francisco gas department is only a part of the plaintiff's entire business. Another instance showing the advantage resulting from consolidation of interests is the saving in cost of operation and maintenance, which resulted from the plaintiff's purchase of the properties and business of the Livermore Light and Power Com-
1500 pany. The general administrative expenses of that company, prior to the purchase of its properties and business by the plaintiff, were approximately \$2,700.00 per year. Since that purchase was completed, the proportion of the plaintiff's general ad-

ministrative expenses assigned to the operation and maintenance of the same properties, and the transaction of the same business, has been approximately \$900.00 per year.

1501 On cross examination conducted by Mr. Searls, counsel for defendants, the witness (J. T. RYAN) testified as follows:

I am familiar with the history of gas companies in San Francisco. Prior to 1903 there was a great deal of competition in the gas business. At times there were as many as three or four competing companies. For a short time prior to the autumn of 1903 the San Francisco Gas and Electric Company, the Independent Gas and Power Company, the Equitable Gas Light Company and the Pacific Gas Improvement Company were in competition. During periods of competition, consumers in competitive districts frequently obtained very low rates.

Under free economic conditions, competition might occur again; however, even in competitive business, the tendency in recent years is not to cut rates. If several companies are operating in competition with each other in the same territory, each company undoubtedly does not do as large a business as it would if it had a monopoly. But the general tendency of competitive business has been to increase the total volume of business transacted.

The plaintiff and the Metropolitan Light and Power Company were in competition prior to the time when the former acquired the properties of the latter, although they were both charging the same rate.

1502 The Pacific Gas and Electric Company has acquired the properties of numerous smaller corporations which were engaged in similar business. One of the objects sought to be accomplished by the plaintiff in acquiring the property of other electric power companies was to eliminate competition, although I think the greater object was to bring about more economical, harmonious and progressive development of the business in which it was engaged. A merger or combination of the power companies now operating in this part of the state will probably result in advantage to the public as well as to the companies. The element of competition is a small factor in the general situation. The main object to be accomplished would be a fuller and more complete development of the industry.

A large corporation occupies a much more favorable position in effecting consolidation than a small corporation. In my opinion, the main advantage possessed by a large corporation is not that it eliminates competition but that it has a comprehensive scheme of development of service. I believe that the most advantageous result attained both from the standpoint of a corporation and the standpoint of the public which it serves is the coordination of service, the standardization of rates and economy in management and operation which the large corporation is able to effect through its

1503 organization. In this connection reference may be made to the accomplishments of the American Bell Telephone Company and to the results accomplished by the National Railroad Administration in relieving car shortage.

For the purposes of the study which I have just presented, it would not be logical to compare the Pacific Gas and Electric Company with the American Bell Telephone Company or with any other specially selected company. But I do think that a comparison of the results accomplished by the Pacific Gas and Electric Company with the results accomplished by the great majority of other public utility corporations operating under normal conditions possesses value as a basis of judgment with respect to the economic advantages which have resulted from its organization and management.

The danger of competition in the gas business in San Francisco has not entirely disappeared even though the plaintiff possesses exclusive rights to use the inventions covered by the Jones patents. At the present moment there is no competition threatening. However, it is impossible to predict when some new and more economical process will be invented and it is quite possible that there may be a development of natural gas within such a distance of San Francisco as will render its transmission practicable.

The financial strength of the Pacific Gas and Electric Company undoubtedly affords some protection against the dangers of competition; but the probability of competition is further diminished by the restrictive legislation by which the gas industry and other public utility enterprises are regulated and controlled.

1505 Mr. JOHN A. BRITTON, a witness recalled for the plaintiff, testified in substance as follows:

I have had a copy of plaintiff's Exhibit No. 19 which shows the plaintiff's revenues and expenses for the four years from July 1, 1912, to June 30, 1916, and am familiar with the basis upon which the general and administrative expenses of the plaintiff have been apportioned in that exhibit between its San Francisco gas department business and the business of its other departments. I am also familiar with the expenses which have been incurred by the plaintiff in the operation of its gas department business in San Francisco as shown in said Exhibit No. 19.

(NOTE.—The revenue and expenses of the plaintiff shown in Exhibit No. 19 are identical with the revenues and expenses shown in plaintiff's Exhibit No. 38 a copy of which is contained in Subdivision II of this statement, except in respect to the two items designated as "Taxes" and "Floating Debt Interest".)

I have made a study of said Exhibit No. 19 and the items contained therein which show the cost of the business conducted by the plaintiff in its San Francisco gas department for the purpose of determining the reasonableness of the amounts charged in said exhibit as administrative expense. I have already testified generally with reference to my experience in the gas business. Among
1506 other things, I managed the affairs of the Oakland Gas Light and Heat Company for quite a period of time. In my judg-

ment, based upon my general experience, my study of plaintiff's Exhibit No. 19 and my study of the circumstances under which the plaintiff's gas department business in San Francisco is conducted, the amount of general and administrative expense apportioned in said Exhibit No. 19 to the plaintiff's San Francisco gas department business is less than the amount which a separate company conducting the plaintiff's San Francisco gas department business independently of any other business would have to expend for like purposes.

Furthermore, the amounts of distribution expenses shown in said Exhibit No. 19 are lower than would be the corresponding expenses if the plaintiff's San Francisco gas department business were conducted separately by a company engaged in that business alone. For the purpose of comparison, I have taken the amount shown in Exhibit No. 19 for distribution expense for the year ending June 30, 1916, to wit, \$618,718.76, and have estimated the amount of the distribution expense which would have been incurred in doing the same work if the plaintiff's San Francisco gas department business had been conducted by a separate company. My estimate of the amount of distribution expense which would have been incurred by a separate company for the same period of time and for the same work is \$667,000.00. The plaintiff, which conducts the 1507 business of manufacturing and distributing electricity as well as gas in San Francisco, effects economies by having the same statement takers read both gas and electric meters as they make their rounds and by having the same collectors collect both gas and electric bills at the same time. It requires but little more time for the statement takers to read both gas and electric meters and for the collectors to collect both gas and electric bills than it would for them to read gas meters and collect gas bills alone. The amounts paid to statement takers and collectors are apportioned between the plaintiff's gas business and its electric business and the saving thus effected in both departments is substantial.

On cross-examination the witness testified as follows:

The amount of distribution expense shown in Exhibit No. 19 is the amount which is actually apportioned to the plaintiff's San Francisco gas department upon its books. My purpose in testifying upon this subject is to show the reasonableness of the charges for distribution expense shown in Exhibit No. 19 which depend in part upon an apportionment of certain expenses, and the reasonableness of the charges shown in Exhibit No. 19 for administrative expenses which are based upon an apportionment of the Pacific Gas and Electric Company's general administrative expense incurred 1508 in conducting its entire business in San Francisco and elsewhere. A company conducting the plaintiff's San Francisco gas department business as a separate enterprise would have a much larger amount of distribution expense and a much larger amount of administrative expense than the corresponding items shown in said Exhibit No. 19.

NOTE.—The Master's discussion of the plaintiff's claim for compensation for management is contained on pages 102 and 103 of his report. The Master made no separate allowance as compensation for management.

1509

SUBDIVISION VII.

Additional Evidence Bearing upon the Question Whether the Maximum Rate Established by the Ordinances Whose Constitutionality is Drawn in Question was or was not a Reasonable and Compensatory Rate for Gas Supplied by the Plaintiff.

NOTE.—Under the provisions of section 19 of article XI of the Constitution of California and the charter of the City and County of San Francisco, the board of supervisors of said city and county was empowered to prescribe and regulate charges for gas, electricity and water. Moreover, the charter of the City and County of San Francisco which went into effect January 8, 1900, required the board of supervisors to fix and determine annually in advance by ordinance the rates to be charged for water, heat, light, power and telephone service during the succeeding fiscal year beginning July 1.

By an amendment of the Constitution of California adopted November 3, 1914, and an act of the legislature enacted pursuant to such amendment, the power to fix rates for public utility services was transferred from the legislative body of San Francisco and other municipal corporations to the Railroad Commission of the State of California from and after the 9th day of August, 1915.

Copies of the ordinances whose constitutionality is drawn in question in the three cases now before the court appear as exhibits attached to the complaints. Of these ordinances, the first became effective July 1, 1913, the second July 1, 1914, and the third July 1, 1915. By each of these ordinances a maximum rate of 75¢ per 1,000 cubic feet of gas was prescribed for the fiscal year next ensuing its adoption.

In each of these cases, a temporary restraining order was granted by the court prior to the adoption of the resolutions about to be mentioned.

Upon the offer of counsel for plaintiff and the admission of their genuineness by counsel for defendants, the Master admitted in evidence, and marked plaintiff's Exhibit No. 49, a certified copy of four resolutions adopted by the board of directors of the Pacific Gas and Electric Company. The first of these resolutions was adopted August 27, 1913, and prescribed as the rate to be charged for gas in San Francisco, effective September 1, 1913, the sum of 85¢ per 1,000 cubic feet except in cases where lower rates should be agreed upon and established by written contract. The second of said resolutions was adopted September 10, 1913, and provided that the rates to be charged for gas sold in San Francisco from and after the first day of September, 1913, until the further order of the board of directors, should, except in cases where a lower rate had been or should thereafter be established by written contract, be as follows:

1511 Eighty-five (85) cents per 1,000 cubic feet for each month in which the amount so delivered does not exceed 20,000 cubic feet;

Eighty-two and one-half (82½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 20,000 cubic feet, but does not exceed 30,000 cubic feet;

Eighty (80) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 30,000 cubic feet, but does not exceed 40,000 cubic feet;

Seventy-seven and one-half (77½) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 40,000 cubic feet, but does not exceed 50,000 cubic feet;

Seventy-five (75) cents per 1,000 cubic feet for each month in which the amount so delivered exceeds 50,000 cubic feet.

The third of said resolutions was adopted July 15, 1914, and established for the fiscal year beginning July 1, 1914, exactly the same schedule of rates which had been established by the aforesaid resolution adopted September 10, 1913. The fourth of said resolutions was adopted July 7, 1915, and established for the fiscal year beginning July 1, 1915, a schedule of rates for gas in San Francisco as follows:

85¢ for each thousand cubic feet of the first 16,500 cubic feet per month;

70¢ for each thousand cubic feet of the next 33,500 cubic feet per month;

65¢ for each thousand cubic feet of the next 100,000 cubic feet per month;

60¢ for each thousand cubic feet of the next 200,000 cubic feet per month;

55¢ for each thousand cubic feet over 350,000 cubic feet per month.

1512 Mr. CHARLES L. BARRETT, a witness called by the plaintiff, testified in substance as follows:

I am 57 years of age, reside in San Francisco and at present occupy the position of assistant secretary of the Pacific Gas and Electric Company. I have held my present position for several years. I have been secretary of the San Francisco Gas and Electric Company for about 15 years. Before that I occupied the position of cashier and general bookkeeper and office manager of the San Francisco Gas and Electric Company. I was cashier and general bookkeeper of the San Francisco Gas and Electric Company from the time of its organization in December, 1896, down to 1902. Prior to January, 1897, I had been for a few years cashier and general bookkeeper for the San Francisco Gas Light Company.

I have correctly compiled from the extant books and records of the San Francisco Gas and Electric Company and from official records a statement containing statistics concerning the financial af-

fairs of the San Francisco Gas and Electric Company. On pages 11 to 11-D of this statement I have shown the regularly established rates for gas in San Francisco from a time antedating the organization of the San Francisco Gas and Electric Company down to the end of June, 1916.

The statement concerning which Mr. Barrett had testified was here admitted in evidence and marked plaintiff's Exhibit No. 1513 40. From Exhibit No. 40 and the testimony of Mr. Barrett it appears that the rates for gas in San Francisco during the period from July 1, 1895, to June 30, 1913, were as follows:

	Per 1,000 cu. ft.
July 1, 1895, to June 30, 1899—General Rate.....	\$1.75
Special rate for fuel—\$1.60.	
July 1, 1899, to June 30, 1900.....	1.50

NOTE.—Between February, 1898, and July, 1903, competitive rates lower than the prescribed rate prevailed in competitive districts.

July 1, 1900, to June 30, 1902.....	1.40
July 1, 1902, to June 30, 1903.....	1.30
July 1, 1903, to July 4, 1904.....	1.20
July 4, 1904, to June 30, 1906.....	1.00

NOTE.—Supervisors failed to fix rates in 1904 but company established rate for fiscal year beginning July 1, 1904, at \$1.00 per 1,000 cubic feet and that rate was adopted by supervisors for fiscal year beginning July 1, 1905.

July 1, 1906, to June 30, 1908.....	.85
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NOTE.—The maximum rate fixed by ordinance was 85¢ per 1,000 cubic feet, but on October 1, 1906, the company voluntarily established and thereafter maintained until July 17, 1908, a graduated schedule of rates as follows:

On basis of monthly consumption:

For 10,000 cubic feet or less 85¢ per 1,000 cu. ft.	
" 10,000 " " to 19,900 cu. ft. incl. 80¢ per 1,000 cu. ft.	
" 20,000 to 29,900 cu. ft. incl. 75¢ per 1,000 cu. ft.	
" 30,000 to 39,900 " " " 70¢ " " " "	
" 40,000 to 74,900 " " " 65¢ " " " "	
" 75,000 cu. ft. or over 60¢ per 1,000 cu. ft.	

1514 July 1, 1908, to June 30, 1911—Ordinance Rate..	.85
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NOTE.—During this period of three years the maximum rate fixed by ordinance was 85¢ per 1,000 cubic feet. But

suits having been brought in the United States Circuit Court by the San Francisco Gas and Electric Company to enjoin the enforcement of the rate fixing ordinances and restraining orders or temporary injunctions having been issued, that company put into effect the following schedule of rates, viz:

On basis of monthly consumption:

For 30,000 cu. ft. or less	\$1.00	per 1,000 cu. ft.
" 30,100 to 40,000 cu. ft.	90¢	" " " "
" 40,100 to 60,000 cu. ft.	87½¢	" " " "
" 60,100 to 80,000 cu. ft.	85¢	" " " "
" 80,100 to 100,000 cu. ft.	82½¢	" " " "
" 100,100 to 150,000 cu. ft.	80¢	" " " "
" 150,100 to 250,000 cu. ft.	77½¢	" " " "
" 250,000 cu. ft. or over	75¢	" " " "

In competitive territory during the period from July 1, 1908, to October 1, 1909, flat rates and special rates, in some cases as low as 60¢ per 1,000 cubic feet, were given.

July 1 to December 31, 1911—Ordinance Rate..... .85

During this period the company maintained the following rate schedule:

On basis of monthly consumption:

For 80,000 cu. ft. or less	85¢	per 1,000 cu. ft.
" 80,100 to 100,000 cu. ft.	82½¢	per 1,000 cu. ft.
" 100,100 " 150,000 " "	80¢	" " " "
" 150,100 " 250,000 " "	77½¢	" " " "
" 250,100 or over,	75¢	per 1,000 cu. ft.

January 1 to June 30, 1912,—Ordinance Rate..... .80

During this period the company maintained the following rate schedule:

On basis of monthly consumption:

For 150,000 cu. ft. or less	80¢	per 1,000 cu. ft.
" 150,100 to 250,000 cu. ft.	77½¢	per 1,000 cu. ft.
" 250,100 or over,	75¢	per 1,000 cu. ft.

During the fiscal year commencing July 1, 1912, and ending June 3, 1913, the maximum rate fixed by ordinance was 75¢ per 1,000 cubic feet, and during that period that price was charged as a flat rate by the company.

During the entire period from July 1, 1895, to July 1, 1916, except the year 1904-5, rates were fixed annually by ordinances 1515 which prescribed in each instance simply a maximum rate and in some instances a minimum charge for service. The maximum rates specified above are those which were prescribed by ordinance as aforesaid.

On cross-examination the witness testified as follows:

During the period between 1897 and 1903 there was very severe competition in the gas business in certain parts of San Francisco. In some places gas rates were cut as low as 25¢ per 1,000 cubic feet. I do not think that the competition put the San Francisco Gas and Electric Company in very bad shape, but I understand that it hit the Pacific Gas Improvement Company very hard. During the latter part of this period the Independent Gas and Power Company took consumers from both the San Francisco Gas and Electric Company and the Pacific Gas Improvement Company, but I think that crippled the Pacific Gas Improvement Company more than it did us. The Equitable Gas Company was not a very serious competitor except in a small district. The Independent Gas and Power Company came into the field and offered to supply gas at 75¢ per 1,000 cubic feet, but never made any money at it. The consolidation of the properties of the Pacific Gas Improvement Company and the Independent Gas and Power Company with those of the San Francisco Gas and Electric Company was effected in the autumn of 1516 1903, and after that the competitive rates were eliminated from time to time as existing contracts expired. Later on there was some competition from the Metropolitan Light and Power Company in the gas business. The Metropolitan Light and Power Company was an actual competitor in a small way in a part of the city.

NOTE.—The revenues and expenses of the San Francisco Gas and Electric Company in its gas department for the calendar years 1897 to 1911, both years included, are shown in the table on page 962a of this statement. The revenues shown in that statement for the calendar years 1908 to 1911 inclusive include those parts of the amounts collected in excess of the rates fixed by ordinance which the San Francisco Gas and Electric Company was permitted to retain by the final decrees in equity cases Nos. 14,742, 14,903 and 15,121 which are hereinafter mentioned.

The revenues and expenses of the Pacific Gas and Electric Company in its San Francisco gas department for the calendar year 1912 as shown on page 17 of plaintiff's Exhibit No. 58 are as follows:

Gross Revenue.....	\$3,137,715.78
Total Expense.....	2,076,447.61
Net Revenue before deduction of charges or reserve for depreciation.....	\$1,061,268.17

The plaintiff's revenues and expenses before deduction of either charge or reserves for insurance and depreciation for the fiscal year beginning July 1, 1912, and ending June 30, 1913, are shown in Exhibit No. 38 a copy of which appears as page 777a of this statement.

1517 Mr. WALTER B. MALING, called for the plaintiff, testified in substance as follows:

I am the clerk of the District Court of the United States for the Northern District of California and as such clerk have in my custody not only the records of said District Court, but also the records of the former Circuit Court of the United States in the 9th Judicial Circuit and the Northern District of California.

At the request of counsel for plaintiff, Mr. Maling thereupon produced and identified as official records of said Circuit Court the judgment roll in each of three cases in which the San Francisco Gas and Electric Company was plaintiff and the City and County of San Francisco, et al., were defendants. These three judgment rolls were admitted in evidence. The first suit was commenced July 9, 1908, and numbered 14,742; the second was commenced June 30, 1909, and was numbered 14,903; and the third was commenced June 15, 1910, and numbered 15,121. These three suits were equity cases and brought for the purpose of enjoining the enforcement of rate fixing ordinances which had been adopted by the board of supervisors of the City and County of San Francisco on the ground that said ordinances were repugnant to the Fourteenth Amendment to the Constitution of the United States of America, the complainant alleging in each instance that the rate established by ordinance was not sufficient to afford just compensation to the
1518 plaintiff for the gas which it furnished, and that the enforcement of such ordinance would result in depriving the complainant of its property without due process of law.

Case 14,742 was brought to enjoin the enforcement of Ordinance No. 451, New Series, approved June 10, 1908, which fixed a maximum rate of 85¢ per 1,000 cubic feet for gas for the year commencing July 1, 1908. In this suit a restraining order was filed July 14, 1908.

Case No. 14,903 was brought to enjoin the enforcement of Ordinance No. 770, New Series approved May 24, 1909, which fixed a maximum rate of 85¢ per 1,000 cubic feet for gas for the year commencing July 1, 1909. In this suit a restraining order was filed June 30, 1909.

Case No. 15,121 was brought to enjoin the enforcement of Ordinance No. 1164, New Series, approved May 3, 1910, which fixed a maximum rate of 85¢ per 1,000 cubic feet for gas for the year commencing July 1, 1910. In this suit a restraining order was filed June 29, 1910.

In each of these three suits designated as Cases Nos. 14,742, 14,903 and 15,121, a stipulation dated June 30, 1911, was filed on the day of its date and was made a part of the judgment roll. All three stipulations were the same in form and substance except that

the form of the decree attached as Exhibit C to the several stipulations was varied to suit the circumstances of each case. A true copy of this stipulation, omitting the title, the signatures and the exhibits referred to therein, is as follows:

1519 Whereas the Board of Supervisors of the City and County of San Francisco did heretofore, on the 8th day of May, 1911, adopt a certain Resolution numbered 7789, New Series, which said resolution was, on the 11th day of May, 1911, approved by the Mayor of said City and County of San Francisco and ex-officio President of said Board of Supervisors, a copy of which said resolution is hereunto annexed, marked Exhibit "A" and by reference made a part hereof; and

Whereas the said Board of Supervisors of said City and County of San Francisco did heretofore, to-wit, on the 15th day of May, 1911, pass a certain Ordinance No. 1559, New Series, fixing the minimum standard quality and illuminating power of gas and the maximum rate and price to be charged therefor for the year commencing July 1, 1911, and ending June 30, 1912, which said Ordinance was, on the 16th day of May, 1911, approved by the Mayor of said City and County and ex-officio President of the Board of Supervisors, a copy of which said Ordinance numbered 1559, New Series, is hereunto annexed, marked Exhibit "B" and by reference hereby made a part hereof; and

Whereas the complainant herein, being a corporation engaged in the business of selling gas to the City and County of San Francisco and its inhabitants, has offered to deliver to the Mayor of said City and County a waiver and relinquishment of its right to call into question or dispute the validity of the rates fixed by said ordinance No. 1559, New Series, for gas supplied to the City and County of San Francisco and its inhabitants for the year commencing July 1, 1911, and ending June 30, 1912;

It is hereby stipulated and agreed by and between the parties hereto that a decree be made, filed and entered by the above entitled court in the above entitled suit in the words and figures set forth in Exhibit C hereto annexed, which is hereby by reference expressly made a part hereof, and that a writ of injunction issue out of and under the seal of the above entitled court in accordance with such decree;

And it is further stipulated and agreed that said court may hereafter make such orders for the enforcement of said decree or in the supervision of the performance thereof as to the court may seem proper in the exercise of the power to make and enter such orders reserved in said Decree.

In each of said three cases designated as Nos. 14,742, 14,903 and 15,121 a final decree was entered pursuant to said stipulation.
1520 The final decrees in all three cases were the same in form and differed in substance only in respect to the amounts of the impounded money which were apportioned to the San Francisco Gas and Electric Company, as plaintiff, to the defendants and the plaintiff's gas consumers.

A true copy of the final decree in said Case No. 15,121, omitting only the title of court and cause, is as follows:

1521

Decree.

The parties hereto and each of them, having this day filed herein a stipulation and consent that a judgment and decree of final injunction in the form of this decree may be made and entered in the above entitled cause, and that a writ of permanent injunction in the form and containing the provisions of that hereinafter ordered be issued out of and under the seal of this court, and the complainant herein having appeared by Garret W. McEnerney, Esq., as its solicitor, and the defendants and each of them having appeared by Percy V. Long, Esq., City Attorney of the City and County of San Francisco, and by Thomas E. Haven, Esq., Assistant City Attorney of said City and County, as their solicitor, and all of the parties hereto having moved the Court to make and enter a decree in the form of this decree; and it appearing that the Board of Supervisors of the defendant City and County of San Francisco has heretofore, on to-wit, the 8th day of May, 1911, adopted a certain resolution numbered 7789 New Series, which resolution was, on the 11th day of May, 1911, approved by the Mayor of said City and County of San Francisco, and ex-officio President of said Board of Supervisors,

1522 and by which said resolution the City Attorney of said City and County of San Francisco was empowered and requested, upon certain conditions therein named, which have been fully complied with, to enter into a stipulation for and to consent to a judgment and decree in this suit containing the terms of this decree; and good cause appearing therefor,

It is hereby ordered, adjudged, and decreed:

I.

That the ordinance of the defendant City and County of San Francisco, a municipal corporation, adopted by the Board of Supervisors of said City and County of San Francisco, on the 2d day of May, 1910, and approved by the Acting Mayor and ex-officio President of the Board of Supervisors of said City and County of San Francisco on the 3d day of May, 1910, which said ordinance is numbered and entitled No. 1164 New Series, "Fixing the minimum standard quality and illuminating power of gas and the maximum rate and price to be charged therefor for the year commencing July 1, 1910, and ending June 30, 1911," a copy of which said ordinance is contained in Exhibit "E" to the bill of complaint herein, was, at the time of its adoption and at the time of its approval, and ever since the time of its approval has been and now is, illegal and void.

II.

That the injury which would result to complainant from the enforcement of said ordinance, and unless the enforcement thereof be enjoined by this Court, would be irreparable. That the commencement and maintenance of this suit, and the rendition of this decree, were and are necessary to prevent irreparable damage to the complainant, and to avoid a multiplicity of suits, proceedings and actions at law, and that the complainant had not, prior to or at the time of the commencement of this suit, nor has it since had, nor has it now, any plain, or speedy, or adequate, or complete remedy at law.

III.

It appearing to the Court that the complainant, in compliance with the injunction order dated June 28, 1910 and filed herein June 29, 1910, has heretofore deposited with the depositary named in said injunction order, and in a separate deposit account, as therein provided, divers sums of money representing compensation heretofore collected by the complainant for gas supplied during the said year beginning July 1, 1910, in excess of the rates specified in said ordinance number 1164 New Series hereinabove referred to, and that the complainant will hereafter from time to time deposit additional moneys in said separate deposit account provided for in said injunction order filed herein June 29, 1910, and that the amounts so heretofore deposited (exclusive of interest thereon) and now contained in said separate deposit account, exclusive of such interest, aggregate the sum of two hundred and eighty-seven thousand, eight hundred and twenty-four and 30/100 dollars (\$287,824.30);

It is ordered, adjudged and decreed, that the complainant is entitled to receive, and shall receive, for its own use and benefit, upon the entry of this decree, one-half of the said sum of \$287,824.30, to-wit, the sum of one hundred and forty-three thousand, nine hundred and twelve and 15/100 dollars (\$143,912.15) out of the sums heretofore deposited under said injunction order, and Walter B. Maling, Deputy Clerk of this Court, appointed a Special Master by said injunction order filed herein June 29, 1910, is hereby directed, as Special Master, to draw and sign a check on said separate deposit account, payable to the order of the complainant herein, for the sum of one hundred and forty-three thousand, nine hundred and twelve and 15/100 dollars (\$143,912.15), which said check shall be countersigned by a judge sitting in this court, and when so countersigned shall be delivered to the complainant by said Special Master, and shall be warrant and authority to the depositary named in said injunction order filed herein June 29, 1910, to pay to complainant, for its own use and benefit, the said sum of \$143,912.15 out of the sums now on deposit in said separate deposit account.

It is further ordered, adjudged and decreed, that the com-
1525 plainant is entitled to receive, and shall receive, for its own
use and benefit, from time to time, as it shall hereafter make
deposits in said separate deposit account provided for in said injunc-
tion order filed herein June 29, 1910, one-half of any sums so here-
after deposited by complainant in said separate deposit account, and
said Special Master is hereby directed, from time to time, and when-
ever the complainant shall make further deposits in said separate
deposit account provided for in said injunction order filed herein
June 29, 1910, to draw and sign checks on said separate deposit ac-
count, payable to the order of the complainant, for sums equal
respectively to one-half of the sums which may be so deposited by
complainant from time to time, which said checks shall be counter-
signed by a judge sitting in this court, and when so countersigned
shall be delivered to the complainant by said Special Master, and
shall be warrant and authority to the depository named in said in-
junction order filed herein June 29, 1910, to pay to complainant for
its own use and benefit, the several sums represented by said checks,
out of the sums on deposit from time to time in said separate deposit
account.

IV.

That the complainant pay to the several consumers of gas in the
City and County of San Francisco who have paid or who shall here-
after pay to complainant for gas sold and delivered to them during
the year beginning July 1, 1920, and ending June 30, 1911,
1526 at a rate in excess of eighty-five cents per one thousand cubic
feet of gas so sold and delivered, one-half of the amount by
which the several sums so paid and which may hereafter be paid by
said several consumers respectively, for gas so sold to them during
said period by complainant, exceeds the amount which would have
been paid by said several consumers had the gas so sold and deliv-
ered to them by the complainant during said period been sold and
delivered by complainant and paid for by said several consumers at
the rate of eighty-five cents per one thousand cubic feet; provided,
however, that the complainant may, and it is hereby authorized to
deduct from the amount which would otherwise be payable to any
consumer under the terms of this decree such sum or sums of money
as, on July 1, 1911, may be due, owing and unpaid from such con-
sumer to complainant. The complainant is entitled, for the purpose
of making the payments in this paragraph provided for, to receive,
and shall receive, from time to time, under orders of this Court to
be hereafter made, the remaining one-half of said sum of \$287,-
824.30, to-wit, the additional sum of one hundred and forty-three
thousand, nine hundred and twelve and 15/100 dollars (\$143,-
912.15), and also the remaining one-half of all sums which may
hereafter be deposited by complainant in said separate deposit ac-
count, provided for in said injunction order filed herein June 29,
1910 (being the one-half remaining after the payments to
1527 complainant provided for in paragraph III hereof), which
moneys, as and when received by complainant, shall be dis-

bursed by it to the several consumers to whom payments are to be made under the terms of this paragraph of this decree, for the purpose of making such payments. All sums so paid to complainant for the purpose of making such payments to consumers shall be paid upon checks drawn by Walter B. Maling, as Special Master, and countersigned by a judge sitting in this court; and the Court hereby reserves the power to hereafter and from time to time, by order, authorize and direct the withdrawal from said separate deposit account of all or any part of said sum of \$143,912.15, and of all or any part of the one-half (not payable to complainant for its own use and benefit, as provided in paragraph III hereof) of any sums hereafter deposited by complainant in said separate deposit account provided for in said injunction order filed herein June 29, 1910, and to authorize and direct payment of any moneys so withdrawn to the complainant, in order that such moneys may by complainant be disbursed to the persons to whom, as consumers of gas, payments are to be made under the terms of this paragraph of this decree.

V.

The division made by this decree of moneys collected by complainant for gas supplied in said City and County during said year
1528 beginning July 1, 1910, in excess of the sums which would have been collected therefor had such gas been sold at the rate of eighty-five cents per one thousand cubic feet (namely, that one-half of such excess be paid to and retained by complainant for its own use, and that one-half thereof be repaid by complainant to the several persons by whom such excess was paid) shall apply to any such excess which may be hereafter collected and to any such excess heretofore collected which has not been deposited in said separate deposit account, if any such there be.

VI.

No consumer of gas shall be entitled to demand or receive from complainant any sum by way of interest on any sum paid by such consumer for gas sold and delivered to him or it during the period beginning July 1, 1910 and ending June 30, 1911 (whether as interest for the period heretofore elapsed since the date of any payment by such consumer for gas sold and delivered to him or it, or for the period which may hereafter elapse prior to any payments to such consumer by complainant under the terms of this decree), nor shall any such consumer be entitled to demand or receive any portion of any sum paid or payable by the depositary under said injunction order filed herein June 29, 1910, by way of interest on moneys deposited with it under said injunction order.

VII.

1529 It appearing to the Court that there is now contained in said deposit account provided for in said injunction order filed herein June 29, 1910, representing interest on moneys

deposited under said injunction order, the sum of two thousand, three hundred and seventy-three and 35/100 dollars (\$2,373.35) and that certain interest may hereafter accrue on account of moneys deposited and which may be deposited in said deposit account; and it further appearing that the compensation of the Special Master appointed by said injunction order is and should properly be payable out of moneys representing interest on said moneys so deposited; and it further appearing that the defendant City and County of San Francisco has, in defense of this suit, and as representing the interests of individual consumers to whom gas was sold by complainant during the said year beginning July 1, 1910 and ending June 30, 1911, paid and expended various large amounts, and has incurred liability for other amounts, and that said City and County of San Francisco should receive, and that complainant is willing that it do receive, in defrayal of said costs and expenses, or of a part thereof, one-half of such portion of the money representing interest on the moneys deposited in said separate deposit account provided for in said injunction order filed herein June 29, 1910, as may remain after the payment to said Special Master of the amount which may be determined to be due him as compensation;

1530 It is ordered, adjudged and decreed, that out of the money representing interest upon the sums deposited and to be deposited in said separate deposit account provided for in said injunction order filed herein June 29, 1910, there shall be paid to Walter B. Maling such sum as this court shall hereafter determine to be properly payable to said Walter B. Maling as compensation for services rendered and to be rendered as such Special Master, and that such sum as may remain out of the said money representing interest on the moneys deposited and to be deposited in said separate deposit account after the deduction of the amount which may be determined to be so payable to said Walter B. Maling shall be paid to the complainant, and one-half thereof shall by complainant be paid to the defendant City and County of San Francisco, for its own use and benefit, and the remaining one-half thereof shall belong to and be retained by the complainant, for its own use and benefit. The Court hereby reserves the power to hereafter determine, by order, the amount payable to said Walter B. Maling, by way of compensation for services rendered and to be rendered by him as such Special Master, and by order to provide from time to time for the withdrawal and payment out of said separate deposit account, to said Walter B. Maling, and to the complainant, of all or any part of such sums as may be payable to them respectively, under the terms of this decree.

1531

VIII.

Neither said City and County of San Francisco nor any consumer of gas, nor any other person, firm or corporation to whom any sum may be payable under the terms of this decree, shall be entitled, by reason of anything herein contained, to bring or maintain any suit or action to recover any sum payable under this decree, or any action or suit based upon this decree, or any provision hereof, or of

any order which may be made supplemental hereto or for the enforcement hereof. The rights of all such persons to receive any sums payable to them, or any of them, under the terms of this decree, or of any such order, shall be enforced and enforceable, unless otherwise expressly provided by order of this court, only by application to this court for the enforcement of this decree and of such orders as may be made supplemental hereto or for the enforcement hereof.

IX.

This decree shall be final and conclusive with respect to the invalidity of the ordinance above referred to, and with respect to the amount payable to the complainant and to the City and County of San Francisco for their own use and benefit respectively, out of the moneys heretofore deposited, or now on deposit, or which may hereafter be deposited, in the separate deposit account provided for in said injunction order filed herein June 29, 1910; but the right 1532 of any other person, whether as a consumer of gas supplied by complainant during said year beginning July 1, 1910, or otherwise, to receive any sum of money payable under the terms of this decree, is hereby expressly made subject to and conditional upon the terms of such orders as may hereafter be made by the court from time to time with respect to the right of any person or persons to share in or to receive any money payable hereunder, and with respect to the time, mode and manner of payment to any such person or persons, and with respect to the terms and conditions on which such payments shall be made.

Unless and until otherwise provided by order of this Court, the claims or claim of any person to receive any money hereunder, or under any order supplemental hereto, shall not be assignable or transferable, and any assignment, attempted assignment, or attempted transfer thereof shall not, until and unless permitted by subsequent order of this Court, and unless made as in such subsequent order provided, be valid or effectual for any purpose.

X.

This Court reserves the right, and shall have power at any time, and from time to time, to make, file and enter such supplemental or other order or orders as may be necessary or proper to enforce or to supervise or direct the performance of this decree, or of any order which may be made for the enforcement hereof, or in the 1533 supervision of the performance hereof, and may, by such order or orders, make provision for the time within which any payments to be made hereunder shall be made; the manner in which such payments shall be made; the appointment or direction of the persons who shall supervise, direct or control the performance of any act performable hereunder, or under any order made in furtherance or in pursuance hereof; the means of identifying persons to whom payments are to be made under the terms of this decree or of any such order; the determination of whether the claims or

claim of persons or of any person entitled to receive any money hereunder or under any such order shall be assignable, and all questions respecting any assignment or attempted assignment thereof; the custody of any books the contents of which it may be or become necessary to inspect in order fully to perform this decree or to enforce or supervise the performance hereof; the mode of keeping accounts of all sums paid or payable under the terms of this decree; the determination of the rights of all persons, or of any person, who may claim rights hereunder; the amount of compensation payable to any person who has been or may be appointed to supervise the performance of this decree; the discharge of any bond or other obligation securing the performance of any order which has heretofore or may hereafter be made herein; and of all other matters and things which it may become necessary or proper to provide for or to determine in order properly and fully to carry out
 1534 and perform and to enforce, supervise, direct and control the performance of the terms of this decree and of any order made in furtherance of this decree and of any of its provisions.

XI.

This decree shall not be held or regarded as rendering any matter res judicata except the invalidity of the ordinance numbered 1164 New Series hereinabove referred to, and the rights of the parties hereto which are expressly determined hereby, or with respect to which some order, adjudication or decree is herein contained.

Nothing herein contained is intended to be, or shall be construed as being an adjudication or finding that any charges made or collected by complainant for gas manufactured, sold or delivered by it in the City and County of San Francisco during the said year beginning July 1, 1910 and ending June 30, 1911, were or are excessive, nor is any sum which by this decree is ordered to be paid by complainant so ordered to be paid on the ground that such sum, or any part thereof, was or will be collected by complainant in excess of a reasonable charge.

This decree is made and entered in accordance with an agreement between the parties hereto, and all sums herein ordered to be paid by complainant are so ordered to be paid with the consent of complainant and in accordance with its voluntary agreement and
 1535 not by reason of any determination that any charge made or to be made by complainant for gas sold by it during the said year beginning July 1, 1910 and ending June 30, 1911, was, is or will be in excess of a reasonable charge.

XII.

That a decree of permanent injunction issue out of and under the seal of this Court and against the defendants, and each of them, enjoining and restraining each of them, and all persons acting by and under their authority, as their officers, agents, servants and employees or otherwise, from in any way enforcing or attempting

to enforce the ordinance of said City and County of San Francisco numbered 1164 New Series hereinabove referred to, or any of the provisions thereof, against the complainant.

Dated: June 30, 1911.

WM. W. MORROW,
Judge.

Endorsed: No. 15,121. Filed and entered June 30, 1911. Southard Hoffman, Clerk, by W. B. Maling, Deputy Clerk.

1536 Mr. FRANK E. OLDIS, a witness called for the plaintiff, testified in substance as follows:

My name is Frank E. Oldis, I am 42 years of age, and am a resident of San Francisco. I am superintendent of the bookkeeping department of the Pacific Gas and Electric Company, having charge of the consumers' gas and electric accounts in San Francisco. I have held that position since March, 1906. I have in my custody and under my control the consumers' registers, the meter books, which make up the accounts and bills, and the supervision of issuing the bills. These books contain a record of the quantity of gas sold, as determined by the meters, to the different consumers in the city and county of San Francisco, and they also contain the amount charged to each consumer. These charges are made monthly and in a few instances more frequently. The books also show the number of consumers taking gas from the Pacific Gas and Electric Company in San Francisco.

We keep our records according to meters, and consider each meter as though it were a consumer for the purpose of our accounts, so that, if one consumer happens to have gas furnished to him at two or more places in the city and county, the bills are rendered for each location, and, for the purpose of our records, he is treated as a separate consumer at each place.

1537 My books contain the entries of the gas furnished to the City and County of San Francisco, whether metered or for public lighting.

I have prepared from the books and records of the Pacific Gas and Electric Company that are in my charge a statement for each of the four years in the period beginning July 1, 1912, and ending June 30, 1916, showing the revenue derived from all consumers whose rates were not less than 75¢ per thousand cubic feet, excluding metered gas and street lighting gas sold to the City of San Francisco, and also showing the amount of gas sold to and the amount of revenue derived from all consumers whose rates were less than 75¢ per thousand cubic feet and also showing separately the estimated amount of gas sold to the City and County of San Francisco for lighting public streets, and the amount paid therefor. To the best of my knowledge and belief, this statement was correctly compiled from those books and records.

The statement referred to by the witness was thereupon admitted in evidence and marked Plaintiff's Exhibit No. 50. Said Exhibit No. 50 consists of 15 pages. Page 15 contains a restatement, in different form, of the same matter as page 14 and need not be copied. A true copy of pages 1, 2, 3, 5, 6, 7, 9, 10, 11, 13 and 14 of said Exhibit No. 50 and a brief summary of the contents of pages 4, 8 and 12 are as follows:

1538

PLAINTIFF'S EXHIBIT NO. 50, PAGE 1.

Statement Showing Revenues Derived from All Consumers Whose Rates Were Not Less Than \$.75 per 1,000 Cubic Feet, Excluding Metered Gas and Street Lighting Sold to City & County of San Francisco.

Fiscal Year July 1, 1912, to June 30, 1913.

Month.	Revenue charged.	Number of consumers at end of month.	Revenue average per consumer.
July—1912	\$200,313.79	89,995	\$2.226
August	201,844.92	91,065	2.216
September	216,315.75	92,498	2.338
October	222,375.78	93,876	2.369
November	268,348.20	95,390	2.813
December	275,103.10	96,504	2.851
January—1913	327,152.70	97,312	3.362
February	290,051.29	97,818	2.965
March	274,418.48	98,409	2.789
April	268,037.82	98,709	2.715
May	243,846.46	98,879	2.467
June	226,837.36	98,773	2.296

Total for Year \$3,014,645.65

Average Consumers per month.....	95,769
Average Revenue per month.....	\$2.617
Average Revenue per year.....	31.478

1539

PLAINTIFF'S EXHIBIT NO. 50, PAGE 2.

Statement Showing Quantities of Gas Sold to and Revenues Derived from All Consumers Whose Rates Were Less Than \$.75 per 1,000 Cubic Feet.

Fiscal Year July 1, 1912, to June 30, 1913.

Recap., Including Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July—1912	5,817.1	\$3,576.88	
August	5,575.7	3,470.04	
September	4,950.6	3,050.98	
October	5,453.3	3,401.11	
November	5,776.5	3,614.74	
December	4,935.7	3,011.17	
January—1913	6,507.8	3,994.46	
February	6,332.5	3,879.03	
March	6,624.6	4,055.42	
April	6,845.3	4,039.18	
May	6,771.7	4,131.63	
June	6,069.2	3,715.39	
Total.....	71,660.0	\$43,940.03	Avg. \$.613 per M Cu. Ft.

Recap., Excluding Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July—1912	4,714.1	\$2,915.22	
August	4,465.4	2,803.80	
September	3,695.7	2,298.09	
October	4,168.7	2,630.33	
November	4,029.7	2,566.65	
December	2,881.9	1,778.92	
January—1913	3,909.5	2,435.51	
February	4,207.2	2,603.92	
March	4,220.2	2,612.74	
April	4,608.5	2,697.12	
May	4,287.4	2,641.14	
June	3,972.7	2,457.43	
Total.....	49,161.0	\$30,440.87	Avg. \$.619 Per M Cu. Ft.

Amount (Estimated) sold to San Francisco for lighting Public Streets.....	123,854.8 M Cu. Ft.
Amount paid by San Francisco for lighting Public Streets including gas consumed and service rendered in furnishing and maintaining Lamps and Lamp-Posts and lighting and extinguishing Lamps	\$171,067.20

1540

PLAINTIFF'S EXHIBIT NO. 50, PAGE 3.

Contracts and Special Rates.

Consumer.	Rate.
J. A. Folger Co., 101 Howard.	250,000 cu. ft. and less.... .75 per M cu. ft. 250,100 to 300,000 cu. ft... .70 " M " 300,100 and over..... .65 " M "
M. J. Brandenstein, 90 Mission.	" "
Hills Bros., 175 Fremont.	" "
A. Schilling & Co., 301 2nd St.	" "
S. Blum, 1465 Polk.	First 29,900 cu. ft..... .75 per M cu. ft. 30,000 to 39,900 cu. ft..... .70 " M " 40,000 to 74,900 " "65 " M " 75,000 or over..... .60 " M "
Cal. Baking Co., 1269 Fillmore.	" "
M. Louston, 3654 Sacramento.	" "
St. Ignatius College, 2211 Hayes.	" "
Jno. Kitchen Jr. Co., 69 1st St.	" "
C. A. Murdock Co., 68 Fremont.	" "
Mrs. J. J. Anderson, 214 Haight.	" "
Ill. Pac. Glass Co., 1841 Folsom.	Comb. Stats.—per month 30 days: First 250,000 cu. ft..... .75 per M cu. ft. Between 250,100 and 300,000 ..... .65 " M " Over 300,100 cu. ft..... .60 " M " Max. Chg. for Cons. under 250,000.. 162.50 Max Chg. for Cons. more than 250,000 and less than 300,000..... 180.00

1541

PLAINTIFFS' EXHIBIT No. 50.

Brief Summary of Contents of Page 4.

Page 4 of Exhibit No. 50 contains a complete list of consumers who received a rate less than 75¢ per 1,000 cubic feet at any time during the fiscal year commencing July 1, 1912, and shows the amount of gas sold to and the amount of revenue derived from each of said consumers for each month during that year. The monthly totals shown on page 4 appear in the recapitulation on page 2. The following is a copy of the list of consumers and of the quantities of gas and the amounts of money charged to them respectively for the month of July, 1912:

	July, 1912.	
	M cu. ft.	Amount.
1. S. Blum.....	24.9	\$16.20
2. Cal. Bak. Co.....	58.6	38.10
3. Mrs. J. J. Anderson.....	33.7	23.85
4. Hills Bros.....	.....	.....
5. C. A. Murdock Co.....	33.8	23.65
6. St. Ignatius College.....	.....	.....
7. Jno. Kitchen Jr. Co.....	.....	.....
8. A. Schilling & Co.....	268.1	187.65
9. J. A. Folger Co.....	.....	.....
10. M. Loustan.....	58.0	37.70
11. Ill. Pac. Glass Co.....	960.3	576.15
12. M. J. Brandenstein.....	666.0	432.90
13. N. M. Adler.....	138.4	83.35
14. Cal. Fruit Cannery Assn.....	82.1	61.60
15. American Can Co.....	2,016.5	1,209.85
16. U. S. Mint.....	373.7	224.22
17. City & Co. of S. F.....	1,103.0	661.66
Totals	5,817.1	\$3,576.88

Consumers numbered 1 to 12 inclusive were charged rates shown on page 3 of Exhibit No. 50. Consumers numbered 13 to 17 inclusive were charged a flat rate of 60¢ per 1,000 cubic feet.

1542

PLAINTIFF'S EXHIBIT No. 50, PAGE 5.

Statement Showing Revenues Derived from all Consumers Whose Rates Were Not Less Than \$.75 Per 1,000 Cubic Feet, Excluding Metered Gas and Street Lighting Sold to City & County of San Francisco.

Fiscal Year July 1, 1913 to June 30, 1914.

Month.	Revenue charged.	Number of consumers at end of month.	Revenue average per consumer.
July-1913	\$209,943.23	99,317	\$2.114
August	219,479.21	99,934	2.196
September	253,159.80	101,128	2.503
October	249,555.13	102,130	2.443
November	309,222.81	103,201	2.996
December	338,950.64	103,943	3.261
January-1914	366,032.31	104,329	3.508
February	317,662.39	104,333	3.044
March	292,653.76	104,391	2.803
April	282,333.77	104,513	2.702
May	272,545.71	104,450	2.609
June	259,810.73	104,471	2.487
Total for year.....	\$3,371,349.49		

Average Consumers per month.....	103,012
Average Revenue per month.....	\$2.722
Average Revenue per year.....	32.727

1543

PLAINTIFF'S EXHIBIT NO. 50, PAGE 6.

Statement Showing Quantities of Gas Sold to, and Revenues Derived from, all Consumers Whose Rates Were Less Than \$.75 Per 1000 Cubic Feet.

Fiscal Year July 1, 1913 to June 30, 1914.

Recap., Including Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July-1913	5,112.6	\$3,118.04	
August	6,528.3	4,042.60	
September	5,697.0	3,517.12	
October	5,787.3	3,598.10	
November	6,179.3	3,836.97	
December	6,565.1	4,082.21	
January-1914	7,285.4	4,510.85	
February	7,598.3	4,713.59	
March	7,682.3	4,750.53	
April	7,958.3	4,867.58	
May	6,963.6	4,317.50	
June	7,782.2	4,814.72	
Total	81,139.7	\$50,169.81	Avg. \$.618 per M Cu. Ft.

Recap., Excluding Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July-1913	2,927.1	\$1,830.69	
August	4,412.8	2,773.31	
September	3,447.5	2,180.63	
October	3,414.0	2,174.13	
November	3,536.2	2,251.19	
December	3,490.2	2,243.27	
January-1914	3,653.0	2,331.46	
February	4,304.0	2,737.00	
March	4,940.4	3,105.34	
April	5,324.6	3,347.35	
May	4,562.6	2,876.92	
June	5,497.6	3,443.98	
Total	49,510.0	\$31,295.27	Avg. \$.632 per M Cu. Ft.

Amount (Estimated) sold to San Francisco for
lighting Public Streets 128,390.3 M Cu. Ft.

Amount paid by San Francisco for lighting
Public Streets including gas consumed and
service rendered in furnishing and main-
taining Lamps and Lamp-Posts and lighting
and extinguishing Lamps..... \$173,956.49

1544

PLAINTIFF'S EXHIBIT No. 50, PAGE 7.

Contracts and Special Rates.

Consumer.	Rate.
J. A. Folger, 101 Howard.	250,000 cu. ft. and less 75¢ per M. 250,100 to 300,000 cu. ft. 70¢ per M. 300,100 and over 65¢ per M.
M. J. Brandenstein, 90 Mission.	Do.
Hills Bros., 175 Fremont.	Do.
Ill. Pac. Glass Co., 1841 Folsom.	Comb. Stats. (per month of 30 days). First 250,000 cu. ft. 80¢ per M. Between 250,100 and 300,000 cu. ft. 65¢ per M. Over 300,100 cu. ft. 60¢ per M. Max. Chg. for cons. under 250,000 \$162.50. Do. more than 250,100 and less than 300,100 \$180.00.
St. Ignatius College, 2211 Hayes.	For a Monthly Cons. of 10,000 cu. ft. or less 85¢ per M. For a Monthly cons. over 10,000 cu. ft. and less than 20,000 cu. ft. 80¢ per M. For a Monthly cons. over 20,000 cu. ft. and less than 30,000 cu. ft. 75¢ per M. For a Monthly cons. over 30,000 cu. ft. and less than 40,000 cu. ft. 70¢ per M. For a Monthly cons. over 40,000 cu. ft. and less than 75,000 cu. ft. 65¢ per M. For a Monthly cons. over 75,000 cu. ft. 60¢ per M said consumption to be computed upon the total registration of all meters installed on premises.
G. Nozawa, 1315 Eddy.	From 1 to 100,000 cu. ft. regular rate to apply. If cons. exceeds 100,000 cu. ft. rate to be 70¢ per M.
U. S. Mint, 5th & Mission.	First 100,000 cu. ft. 75¢ per M. Next 200,000 cu. ft. 70¢ pr M. Next 300,000 cu. ft. 65¢ per M. All over 600,000 cu. ft. 60¢ per M.

1545

PLAINTIFF'S EXHIBIT No. 50.

Brief Summary of Contents of Page 8.

Page 8 of Exhibit No. 50 contains a complete list of consumers who received a rate less than 75¢ per 1,000 cubic feet at any time during the fiscal year commencing July 1, 1913, and shows the amount of gas sold to and the amount of revenue derived from each of said consumers for each month during that year. The monthly totals shown on page 8 appear in the recapitulation on page 6. The following is a copy of the list of consumers and of the quantities of gas and the amounts of money charged to them respectively for the month of July, 1913:

	July, 1913.	
	M cu. ft.	Amount.
1. St. Ignatius College.....	.....	.....
2. Hills Bros.	540.4	\$351.25
3. M. J. Brandenstein Co.....	.....	.....
4. Ill. Pac. Glass Co.....	339.7	203.80
5. G. Nozawa .....	.....	.....
6. Calif. Fruit Cannerns Assn.....	19.2	11.50
7. U. S. Mint.....	413.6	288.84
8. American Can Co.....	1,479.2	887.55
9. J. A. Folger Co.....	135.0	87.75
10. City and County of S. F.....	2,185.5	1,287.35
Totals.....	5,112.6	\$3,118.04

Consumers numbered 1 to 5 inclusive, 7 and 9 were charged rates shown on page 7 of Exhibit No. 50. Consumers numbered 6, 8 and 10 were charged a flat rate of 60¢ per 1,000 cubic feet.

1546

PLAINTIFF'S EXHIBIT No. 50, PAGE 9.

Statement Showing Revenues Derived from All Consumers Whose Rates Were Not Less than \$.75 per 1,000 Cubic Feet, Excluding Metered Gas and Street Lighting Sold to City & County of San Francisco.

Fiscal Year July 1, 1914, to June 30, 1915.

Month.	Revenue charged.	Number of consumers at end of month.	Revenue average per consumer.
July—1914	\$253,786.84	104,755	\$2.422
August	244,276.70	105,650	2.312
September	275,385.65	106,529	2.585
October	278,619.97	107,586	2.589
November	285,193.76	108,506	2.628
December	337,021.87	109,291	3.083
January—1915	381,649.61	110,001	3.469
February	317,377.41	110,619	2.869
March	325,799.08	111,432	2.923
April	319,408.67	111,508	2.865
May	308,056.04	111,179	2.771
June	286,240.87	111,238	2.573
Total for Year.			\$3,612,816.47

Average Consumers per month.....	109,024
Average Revenue per month.....	\$2.757
Average Revenue per year.....	\$33.14

1547

PLAINTIFF'S EXHIBIT NO. 50, PAGE 10.

Statement Showing Quantities of Gas Sold to, and Revenues Derived From All Consumers Whose Rates Were Less Than \$.75 per 1,000 Cubic Feet, Excluding Gas Sold to Panama Pacific Exposition.

Fiscal Year July 1, 1914, to June 30, 1915.

Recap., Including Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July-1914	7,115.2	\$4,434.76	
August	6,477.8	\$4,024.40	
September	7,309.3	4,570.29	
October	7,419.9	4,630.33	
November	7,097.4	4,409.30	
December	8,684.0	5,436.99	
January-1915	8,703.7	5,379.44	
February	8,764.2	5,438.96	
March	8,566.6	5,295.83	
April	8,820.2	5,447.68	
May	8,969.9	5,542.31	
June	8,685.8	5,382.43	
Total.....	96,614.0	\$59,992.72	Avg. \$.621 per M Cu. Ft.

Recap., Excluding Metered Gas Sold to City & County of San Francisco.

	M cubic feet.	Amount.	
July-1914	4,688.6	\$2,978.87	
August	3,921.6	2,490.80	
September	4,612.6	2,952.29	
October	4,497.7	2,877.00	
November	4,044.0	2,577.35	
December	4,561.8	2,963.80	
January-1915	4,500.4	2,857.49	
February	4,903.0	3,122.30	
March	5,008.0	3,160.65	
April	5,444.2	3,422.10	
May	5,498.5	3,459.52	
June	5,666.8	3,571.04	
Total.....	57,347.2	\$36,433.21	Avg. \$.635 per M Cu. Ft.

	M cu. ft. for year.	Revenue for year.	Rate per M cu. ft.
Amount of Gas sold to Panama-Pacific Exposition	69,547.3	\$50,401.76	\$.724
Amount paid by San Francisco for lighting Public Streets including gas consumed and service rendered in furnishing and maintaining Lamps and Lamp-Posts and lighting and extinguishing lamps			\$180,199.91
Amount (estimated) sold to San Francisco for lighting public streets.....	132,884.7 M cu. ft.		

1548 PLAINTIFF'S EXHIBIT No. 50, PAGE 11.

Contracts and Special Rates.

Consumer.	Rate.
J. A. Folger, 101 Howard.	250,000 Cubic Ft. and less..... 75¢ per M. 250,100 to 300,000 Cu. Ft..... 70¢ per M. 300,100 and over 65¢ per M.
M. J. Brandenstein, 90 Mission.	do.
Hills Bros., 1175 Fremont.	do.
Hoover Spring Co., 633 Turk.	do.
Illinois Pacific Glass Company, 1841 Folsom.	Comb. Stats. (per month 30 days). First 250,000 Cu. Ft..... 80¢ per M. Between 250,100 and 300,000 cu. ft. 65¢ per M. Over 300,100 cu. ft..... 60¢ per M. Max. Chg. for cons. under 250,000. \$162.50 " " " " more than 250,- 100 and less than 300,100..... \$180.00
St. Ignatius' College, 2211 Hayes.	For a monthly cons. of 10,000 cu. ft. or less 85¢ per M. For a monthly cons. of over 100,- 000 cu. ft. and less than 20,000 cu. ft. 80¢ per M. For a monthly cons. of over 20,- 000 cu. ft. and less than 30,000 cu. ft. 75¢ per M. For a monthly cons. over 30,000 cu. ft. and less than 40,000 cu. ft. 70¢ per M. For a monthly cons. over 40,000 cu. ft. and less than 75,000 cu. ft. 65¢ per M.

Consumer.

Rate.

For a monthly cons. over 75,000. 60¢ per M. said cons. to be computed upon the total registration of all meters installed on premises.

G. Nozawa,
1315 Eddy.

From 1 to 100,000 cu. ft. regular rate to apply. If cons. exceeds 100,000 cu. ft. rate to be 70¢ per M.

S. Otake,
1315 Eddy.

do.

U. S. Mint,
5th & Mission.

First 100,000 cu. ft.	75¢	per M.
Next 200,000 cu. ft.	70¢	per M.
Next 300,000 cu. ft.	65¢	per M.
All over 600,000 cu. ft.	60¢	per M.

Albert Emhoff,
930 Geneva.

Less than 20,000 cu. ft.	85¢	per M.
20,000 to 29,900 cu. ft.	82½¢	per M.
30,000 to 39,900 cu. ft.	80¢	per M.
40,000 to 49,900 cu. ft.	77½¢	per M.
50,000 and over.	75¢	per M.

E. Neugebauer,
807 Mt. Vernon.

do.

1549

PLAINTIFF'S EXHIBIT No. 50.

Brief Summary of Contents of Page 12.

Page 12 of Exhibit No. 50 contains a complete list of consumers who received a rate less than 75¢ per 1,000 cubic feet at any time during the fiscal year commencing July 1, 1914, and shows the amount of gas sold to and the amount of revenue derived from each of said consumers for each month during that year. The monthly totals shown on page 12 appear in the recapitulation on page 10. The following is a copy of the list of consumers and of the quantities of gas and the amounts of money charged to them respectively for the month of July, 1914:

	July, 1914.	
	M cu. ft.	Amount.
1. St. Ignatius College		
2. G. Nozawa	254.0	\$177.80
3. S. Otake		
4. Hoover Springs Co.		
5. M. J. Brandenstein	445.0	289.25
6. Ill. Pac. Glass Co.	397.0	238.20
7. Albert Emhoff		
8. E. Neugebauer	106.6	79.45
9. Hills Bros.	593.8	385.95
10. Cal. Fruit Cannery Assn.	59.8	35.85
11. U. S. Mint	506.8	349.42
12. American Can Co.	2,049.8	1,229.90
13. J. A. Folger Co.	275.8	193.05
14. City & County of S. F.	2,426.6	1,455.89
Totals	7,115.2	\$4,434.76

Consumers numbered 1 to 9 inclusive, 11 and 13 were charged rates shown on page 11 of Exhibit No. 50. Consumers numbered 10, 12 and 14 were charged a flat rate of 60¢ per 1,000 cubic feet.

1550

PLAINTIFF'S EXHIBIT No. 50, PAGE 13.

Statement Showing Revenues Derived From All Consumers Who Used Less Than 50,000 Cubic Feet of Gas Per Month and Whose Rates Exceeded \$.75 Per 1,000 Cubic Feet on the Average.

Fiscal Year July 1, 1915, to June 30, 1916.

Month.	Revenue charged.	Number of consumers at end of month.	Revenue average per consumer.
July-1915	\$267,598.48	110,903	\$2.413
August	258,851.13	111,270	2.326
September	290,346.59	111,631	2.60
October	279,918.75	112,137	2.496
November	299,074.70	112,702	2.653
December	309,300.00	112,530	2.748
January-1916	344,858.81	112,261	3.072
February	317,189.54	112,147	2.828
March	295,756.03	111,705	2.648
April	283,537.90	111,276	2.548
May	249,259.86	110,763	2.25
June	252,538.45	110,207	2.291

Total for Year \$3,448,230.24

Average Consumers per month	111,628
Average Revenue per month	\$2.573
Average Revenue per year	\$30.89

1551

PLAINTIFF'S EXHIBIT No. 50, PAGE 14.

Statement Showing Quantities of Gas Sold to and Revenues Derived From All Consumers Who Used Not Less Than 50,000 Cubic Feet of Gas Per Month and Whose Rates Did Not Exceed 75 Cents Per 1,000 Cubic Feet on the Average.

City & County of S. F. and Panama Pacific Exposition Excluded.

Fiscal Year July 1, 1915, to June 30, 1916.

Quantity of gas sold—M cu. ft.

Month.	No. of consumers.	Quantity of gas sold—M cu. ft.				Revenue.		
		First 16,500 cu. ft., \$85.	Next 33,500 cu. ft., \$70.	All over 50,000 cu. ft., as schedule.		First 16,500 cu. ft.	Next. 33,500 cu. ft.	All over 50,000 cu. ft.
1915.								
July	452	7,458.0	15,142.0	13,645.3		\$6,339.30	\$10,599.40	\$9,157.90
Aug.	357	5,890.5	11,959.5	16,472.2		5,006.93	8,371.65	10,074.51
Sep.	345	5,692.5	11,557.5	17,623.5		4,838.63	8,090.25	10,940.42
Oct.	400	6,600.0	13,400.0	18,830.3		5,610.00	9,380.00	11,942.55
Nov.	480	7,920.0	16,080.0	20,445.1		6,732.00	11,256.00	12,615.30
Dec.	503	8,299.5	16,850.5	20,930.9		7,054.58	11,795.35	13,070.67

Statement Showing Quantities of Gas Sold.—Continued.

Month.	No. of con- sumers.	Quantity of gas sold—M cu. ft.			Revenue.		
		First 16,500 cu. ft., \$85.	Next 33,500 cu. ft., \$70.	All over 50,000 cu. ft., as schedule.	First 16,500 cu. ft.	Next 33,500 cu. ft.	All over 50,000 cu. ft.
1916.							
Jan.	624	10,296.0	20,904.0	24,713.0	8,751.60	14,632.80	15,103.22
Feb.	517	8,530.5	17,319.5	21,113.1	7,250.93	12,123.65	12,519.40
March	456	7,524.0	15,276.0	20,052.1	6,395.40	10,693.20	11,966.89
April	403	6,649.5	13,500.5	17,913.1	5,652.08	9,450.35	10,972.25
May	351	5,791.5	11,758.5	16,438.3	4,922.78	8,230.95	10,210.46
June	393	6,484.5	13,165.5	17,741.5	5,511.83	9,216.85	10,927.70
		87,136.5	176,913.5	225,918.4	\$74,066.06	\$123,840.45	\$139,501.27
Total Gas			489,968.4 M cu. ft.		Total Revenue		\$337,407.78
Average rate per M cu. ft. for year							\$.6887
Amount of metered gas sold to San Francisco					M cu. ft. for year.	Revenue for year.	Rate per M cu. ft.
Amount of gas sold to Panama Pacific Exposition					44,758.1	26,847.12	\$.60
					81,777.2	59,038.86	\$.722
Amount—estimated—sold to San Francisco for lighting public streets.						136,681.3 M cu. ft.	
Amount paid by San Francisco for lighting public streets including gas consumed and service rendered in furnishing and maintaining lamps and lamp-posts and lighting and extinguishing lamps.							\$184,205.58

1552 Sheet 2 is a summary and is based upon and compiled from sheets 3 and 4.

Sheet 4 contains a list of the names of the consumers who received a rate less than 75¢ per thousand cubic feet during the period from July 1, 1912, to June 30, 1913. The term "list" written opposite some of the names refers to the rates which are shown as contract rates on page 3, and the letters "Fl" near the bottom of sheet 4 stand for "flat" or "flat rate." The consumers from that point down are under that rate, that is, under a flat rate of 60¢ per thousand cubic feet. That includes the California Fruit Cannery Association, N. M. Adler, the American Can Company, the U. S. Mint, and the City and County of San Francisco for its metered lighting. Sheet 4 also shows in terms of thousand cubic feet the quantity of gas sold to each of these consumers each month during the fiscal year commencing July 1, 1912, and the amount charged, according to the amount they used. The figures in the column headed "M cubic feet" indicate the quantity in thousands of cubic feet, so that 24.9 would mean 24,900 cubic feet, and so on with the other figures.

1553 On sheet 4, in the case of the City and County of San Francisco, I have used the expression "Various-metered." That covers all of the meters used in measuring gas to San Francisco. That sheet, however, does not contain any statement of the quantity of gas sold to San Francisco, or the revenue derived from San Francisco from public street lighting. That is shown on sheet 2. At the foot of page 2 is the estimated amount sold to San Francisco for lighting public streets; that is obtained by multiplying the number of hours the lamps have burned during the month by their rated capacity. There is no meter record for that gas.

The item, "Amount paid by San Francisco for lighting public streets, including gas consumed and service rendered in furnishing and maintaining lamps and lamp posts and lighting and extinguishing lamps, \$171,067.20" is determined by contract with the City and County. So far as my records are concerned, there is no apportionment of that sum as between the charge for the service in lighting and maintaining lamps and lamp posts and the amount charged for the gas used in the lamps. The remaining pages of Exhibit No. 50 cover later years in similar manner.

From July 1, 1912 to and including the month of August, 1913, the rate that was actually charged on the plaintiff's books for the gas sold to all consumers, except those listed in this special list, was 75¢ per 1,000 cubic feet.

1554 From September 1, 1913, to June 30, 1915, the schedule rates of 85¢ to 75¢ were charged to all consumers with the exception of a few who had the special rates shown in this exhibit. For the year 1915-16 the present block schedule of 85¢ to 55¢ was in use.

The City and County of San Francisco, during that year, had for its metered lighting a 60¢ flat rate. The Panama-Pacific Exposition was given a 75¢ flat rate with the single exception of what was known as the Collective Gas Exhibit, which had a display of gas ranges and other implements and which was given a rate of 60¢ a thousand cubic

feet. The result of those two rates, as aggregated on page 14, makes an average rate of 72.2¢.

During the fiscal year from July 1, 1915, to June 30, 1916, there were a few consumers who still had special rates under old contracts, such as the California Cannery Association. The amount of gas used by those consumers who had the special contract rates exceeded by far 50,000 cubic feet a month. All of those consumers 1555 are included in the recapitulation on page 14, so that page 14 shows the revenue derived from all consumers during the fiscal year beginning July 1, 1915, except those covered by the statement on page 13; that is to say, page 14 covers those who were on the block schedule and the few who had special contract rates. Only one or two of those special contracts continued into the year 1915-16. They are out of existence now.

1555½

VOLUME 6.

Copy.

In the Southern Division of the District Court of the United States
in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and
Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
et al., Defendants and Respondents.

*Condensed Statement of Evidence Prepared Pursuant to Equity Rule
No. 75 and Order of Court Approving the Same.*

Endorsed: Filed April 5, 1922. Walter B. Maling, Clerk.

Mr. J. D. BUTLER, auditor of the Pacific Gas and Electric Company in its San Francisco District, recalled for the plaintiff, testified as follows:

I have prepared from the books of the Pacific Gas and Electric Company in my custody a statement showing the total amount of gas sold and the revenue derived from the sales of gas to plaintiff's general consumers and from municipal street lighting and municipal lighting and heat in San Francisco for the fiscal years beginning July 1, 1912, 1913, 1914 and 1915. This statement, to the best of my knowledge and belief, has been correctly compiled and transcribed from said books and records.

This statement was admitted in evidence and marked Plaintiff's Exhibit No. 51. A true copy of said Exhibit No. 51 is in the words and figures following:

1556

EXHIBIT No. 51, P. 1.

Pacific Gas and Electric Company, San Francisco District Sales of Gas

1912-1913.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	4,024,728,040	\$3,022,872.61	\$.751
*Mun. St. Ltg.	123,854,800	84,128.82	.679
Mun. Ltg. & Heat	22,499,000	13,499.16	.600
Total	4,171,081,840	\$3,120,500.59	\$.748

Yearly Average No. of Consumers all meters..
Avg. Sale Per Yr. Cu. Ft.
" " Mo.

96,035
43,433
3,619

General Consumers, Exclusive of City & County and Special Rates.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	3,975,567,040	\$2,992,431.74	\$.753
No. of Meters	95,769		
Avg. Sales Year	41,512 Cu. Ft.		
" " Month	3,459 " "		

San Francisco District Sales of Gas.—Continued.

1913-1914.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	4,129,286,750	\$3,378,386.83	\$.818
•Mun. St. Lag.	128,390,300	83,818.01	.653
„ Lag. & Heat	31,629,700	18,874.54	.597
Total	4,289,306,750	\$3,481,079.38	\$.812

Yearly Average No. of Consumers all meters ..
 Avg. Sale Per Year, Cu. Ft.
 „ „ „ Mo.

103,252
 41,542
 3,462

General Consumers, Exclusive of City & County and Special Rates.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	4,079,776,750	\$3,347,091.56	\$.820
No. of Meters	103,012		
Avg. Sale Year, Cu. Ft.	39,605		
„ „ „ Mo.	3,300		

1557

EXHIBIT No. 51 P. 2.

1914-1915.

Gen. Consumers	
*Min. St. Ltg.	
" Ltg. & Heat	
P. P. I. Exposition	
Total	
Yr. Average No. of Consumers all meters...	
Avg. Sale Per Yr. Cu. Ft.	
" " Mo.	

Revenue.	Rev. per M cu. ft.
\$3,625,669.21	\$.832
86,970.96	.654
23,559.51	.600
50,401.76	.724
<hr/>	
\$3,786,601.44	\$.824

General Consumers, Exclusive of City & County and Special Rates.

Gen. Consumers	
No. of Meters	
Avg. Sale Per Yr. Cu. Ft.	
" " Mo.	

Revenue.	Rev. per M cu. ft.
\$3,589,236.00	\$.835

San Francisco District Sales of Gas.—Continued.

1915-1916.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	4,557,938,700	\$3,772,132.04	\$.828
*Mun. St. Ltg.	136,681,300	88,754.64	.649
" Ltg. & Heat	44,758,100	26,847.12	.600
P. P. I. Exposition	81,777,200	59,038.86	.722
Total	4,821,155,300	\$3,946,772.66	\$.819

Yr. Average No. of Consumers all meters.	112,338
Avg. Sale Per Yr. Cu. Ft.	42,917
" " Mo.	3,576

General Consumers, Exclusive of City & County and Special Rates.

	Cu. ft.	Revenue.	Rev. per M cu. ft.
Gen. Consumers	4,067,970,300	\$3,434,724.26	\$.844
No. of Meters	111,628		
Avg. Sale Per Yr. Cu. Ft.	36,442		
" " Mo.	3,037		

1558

EXHIBIT No. 51, P. 3.

*NOTE.—The quantity of gas supplied for City and County Street Lighting is estimated from the number of lamps, length of time during which they were lit and rated capacity of lamps.
The following represents the revenue received for City and County Street Lighting divided into gas sold and street lighting service.

	1912-13.	1913-14.	1914-15.	1915-16.
Gas sold	\$84,128.82	\$83,818.01	\$86,970.96	\$88,754.64
Service	86,938.38	90,138.48	93,228.95	95,450.94
Total	<u>\$171,067.20</u>	<u>\$173,956.49</u>	<u>\$180,199.91</u>	<u>\$184,205.58</u>

NOTE.—Meter Minimum charges not included in above, were as follows: (M. H. B. includes.)

	1912-13.	1913-14.	1914-15.	1915-16.
\$22,213.91				
		\$24,257.93	\$23,580.47	\$13,505.98

1559 Mr. F. E. OLDIS, a witness recalled on plaintiff's behalf, testified in substance as follows:

I have prepared, as a supplement to Plaintiff's Exhibit No. 50, a further statement showing the quantities of gas sold to and revenue derived from all consumers who used not more than 16,500 cubic feet of gas per month, and also showing the quantities of gas sold to and revenue derived from all consumers who used more than 16,500 cubic feet and less than 50,000 cubic feet of gas per month, during the fiscal year beginning July 1, 1915. This statement is a correct compilation from the books and records of the company in my possession and under my control.

This statement was admitted in evidence, marked "Plaintiff's Exhibit No. 56," and is in the words and figures following:

*Statement Showing Quantities of Gas Sold to and Revenue Derived From All Consumers Who Used not More Than
16,500 Cubic Feet of Gas Per Month.*

Fiscal Year July 1, 1915, to June 30, 1916.

Month.	Number of consumers at end of month.	Revenue charged.	Average revenue charged.	Quantity of gas sold, M cu. ft.	Average quantity of gas sold, M cu. ft.
July-1915	109,270	\$234,010.48	\$2.142	269,661.1	2.47
August	109,747	226,953.45	2.069	257,521.5	2.35
September	110,121	258,605.90	2.348	284,030.5	2.58
October	110,448	243,131.93	2.201	298,673.0	2.7
November	110,647	256,464.24	2.318	312,459.5	2.82
December	110,334	262,642.30	2.38	307,177.1	2.78
January-1916	109,269	282,546.20	2.586	330,623.7	3.02
February	109,499	262,333.79	2.396	305,910.4	2.79
March	109,673	254,120.63	2.317	296,858.3	2.71
April	109,454	245,796.98	2.246	286,790.9	2.62
May	109,211	216,356.96	1.981	251,551.9	2.3
June	108,674	220,624.72	2.03	256,975.7	2.37
Total Revenue		\$2,963,787.58			
Total M. Cu. Ft.				3,458,233.6	
Average Rate per M. Cu. Ft.					\$.857
Average Consumers per month.					109,695
Average Revenue Per Consumer Per Month.		\$2.35			
Average Revenue Per Consumer Per Year.		\$27.01			
Average M. Cu. Ft. Per Consumer Per Month.					2.626
Average M. Cu. Ft. Per Consumer Per Year.					31.52

1561

EXHIBIT No. 56, P. 2.

Statement Showing Quantities of Gas Sold to and Revenues Derived From All Consumers Who Used More Than 16,500 Cubic Feet and Less Than 50,000 Cubic Feet of Gas Per Month.

Fiscal Year July 1, 1915, to June 30, 1916.

Month.	Number of consumers at end of month.	Revenue charged.	Average revenue charged.	Average quantity of gas sold,	
				Quantity sold, M cu. ft.	M cu. ft.
July-1915	1,633	\$33,588.00	\$20.57	41,943.6	25.7
August	1,523	31,897.68	20.944	40,165.2	26.4
September	1,510	31,740.69	21.02	40,182.0	26.0
October	1,689	36,786.82	21.785	46,300.7	27.4
November	2,055	42,610.46	20.735	53,558.1	26.0
December	2,196	46,657.70	21.247	58,612.2	26.7
January-1916	2,992	62,312.61	20.827	77,840.3	26.0
February	2,648	54,855.75	20.716	69,018.4	26.0
March	2,032	41,625.40	20.49	52,427.5	25.8
April	1,822	37,740.92	20.714	48,095.7	26.4
May	1,552	32,902.90	21.20	41,455.2	26.7
June	1,533	31,913.73	20.818	40,107.8	26.2
Total Revenue.		\$484,642.66		609,736.7	
Total M. Cut ft.					\$.7949
Average rate per M. Cu. ft.					1,933
Average consumers per month.					
Average revenue per consumer per month.		\$20.922			
Average revenue per consumer per year.		\$250.72			
Average M. Cu. ft. per consumer per month.					26.3
Average M. Cu. ft. per consumer per year.					315.4

1562 It is to be observed that the average rate per thousand cubic feet shown on page 1 of Exhibit No. 56 is \$.857, notwithstanding the fact that the top rate in the block schedule which was in effect during the fiscal year commencing July 1, 1915, was 85¢ per thousand cubic feet. The fact that the average rate shown on page 1 of Exhibit No. 56 is higher than the top rate is due to the fact that during the last mentioned fiscal year there was a minimum charge of 50¢ per meter which was imposed upon all consumers who used less than 50¢ worth of gas at the rate of 85¢ per thousand cubic feet.

1563 The witness, Mr. F. E. OLDIS, continued as follows:

I have prepared from the books of the Pacific Gas and Electric Company and its predecessors, the San Francisco Gas and Electric Company and the Metropolitan Light and Power Company a statement showing the quantity of gas sold to and revenue derived from consumers classified according to the quantity used, in the month of October in each of the years from 1905 to 1916 inclusive. This statement was prepared under my direction and to the best of my knowledge and belief is a correct compilation of the records contained in the books that are under my control.

This statement was admitted in evidence and marked Plaintiff's Exhibit No. 63. A true copy of pages 1 to 13 of said Exhibit are in the words and figures following:

San Francisco Gas and Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1905.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	4,760	2,440.0	.51+	\$2,372.35	\$.50—
Second	6,498	5,862.8	.90+	5,862.80	.90+
Third	7,389	9,704.1	1.31+	9,704.10	1.31+
Fourth	10,939	19,545.6	1.79+	19,545.60	1.79—
Fifth	12,734	32,490.4	2.55+	32,490.40	2.55+
Total	42,320	70,042.9	.....	\$69,975.25	.....
Average for five classes			1.655	.....	\$1.653
Total number of consumers at end of month					65,940
Total quantity of gas sold to all consumers except S. F. metered and street lighting					194,044.7 M cu. ft.
Total revenue all consumers except S. F.					\$188,347.33

Rate—\$1.00 per M cu. ft.—no minimum charge.

NOTE A.—First class includes all consumers who used not more than 600 cu. ft.

Second do. do. more than 600 and not more than 1,000 cu. ft.

Third do. do. more than 1,000 and not more than 1,500 cu. ft.

Fourth do. do. more than 1,500 and not more than 2,000 cu. ft.

Fifth do. do. more than 2,000 and not more than 3,000 cu. ft.

NOTE B.—Revenue for first class shown on this page and succeeding pages is amount taken from books and includes minimum charges in years when they were made.

Revenue for other classes is computed by multiplying quantity by rates except when otherwise noted.

San Francisco Gas & Electric Co.

*Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity
Used in Month of October, 1906.*

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quan- tity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	1,723	868.4	.50+	\$736.95	\$.43—
Second	2,482	2,254.0	.91—	1,915.90	.77+
Third	3,254	4,307.2	1.32+	3,661.12	1.12+
Fourth	5,757	10,377.4	1.80—	8,820.79	1.53+
Fifth	9,438	24,336.6	2.58—	20,686.11	2.19+
Total	22,654	42,143.6	.....	\$35,820.87	.....
Average for five classes			1.86	.....	\$1.581
Total number of consumers at end of month					43,443
Total quantity of gas sold to all consumers except S. F. metered and street lighting					158,205.8 M cu. ft.
Total revenue all consumers except S. F.					\$128,301.41

Rate \$.85 per M cu. ft.—no minimum charge.

EXHIBIT No. 63, P. 3.

San Francisco Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1907.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	2,783	1,402.4	.50+	\$1,173.25	\$.42+
Second	3,750	3,414.5	.91+	2,902.33	.77+
Third	4,719	6,147.7	1.30+	5,255.55	1.11+
Fourth	7,952	14,313.8	1.80	12,166.73	1.53
Fifth	11,814	30,343.0	2.57—	25,791.55	2.18+
Total	31,018	55,621.4	.....	\$47,289.41	.....
Average for five classes			1.793	.....	\$1.524
Total number of consumers at end of month					55,872
Total quantity of gas sold to all consumers except S. F. metered and street lighting					201,493.6 M cu. ft.
Total revenue all consumers except S. F.					\$161,549.66

Rate \$.85 per M cu. ft.—no minimum charge.

1567

EXHIBIT No. 63, P. 4.

San Francisco Gas & Electric Co.

*Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity
Used in Month of October, 1908.*

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quan- tity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	4,984	1,925.4	.39—	\$2,581.14	\$.52—
Second	4,934	4,469.3	.91—	4,469.30	.91—
Third	6,583	8,595.7	1.31—	8,595.70	1.31—
Fourth	10,137	18,292.9	1.80+	18,292.90	1.80—
Fifth	13,201	34,601.4	2.62+	34,601.40	2.62+
Total	39,839	67,884.7	.....	\$68,540.44	.....
Average for five classes			1.704	.....	\$1.72
Total number of consumers at end of month					60,895
Total quantity of gas sold to all consumers except S. F. metered and street lighting					205,004.1 M cu. ft.
Total revenue all consumers except S. F.					\$190,934.89

Rate—\$1.00 per M cu. ft. minimum charge \$.50 per meter.

1568

EXHIBIT No. 63, P. 5.

San Francisco Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1909.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	4,629	1,738.5	.38—	\$2,445.05	\$.53—
Second	4,994	4,505.5	.90+	4,505.50	.90+
Third	6,413	8,378.3	1.31—	8,378.30	1.31—
Fourth	10,942	19,762.7	1.80+	19,762.70	1.80+
Fifth	14,444	36,918.4	2.56—	36,918.40	2.56—
Total	41,422	71,303.4	.....	\$72,009.95	.....
Average for five classes			1.721	.....	\$1.738
Total number of consumers at end of month					64,314
Total quantity of gas sold to all consumers except S. F. metered and street light-					220,260.6 M cu. ft.
Total revenue all consumers except S. F.					\$210,397.82

Rate—\$1.00 per M cu. ft.—Minimum charge \$.50 per meter.

San Francisco Gas & Electric Co.

*Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity
Used in Month of October, 1910.*

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quan- tity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	5,798	2,208.1	.38+	\$2,991.92	\$.52—
Second	6,035	5,464.6	.91—	5,464.60	.91—
Third	7,474	9,753.3	1.30+	9,753.30	1.30+
Fourth	12,165	21,927.7	1.80+	21,927.70	1.80+
Fifth	15,652	40,062.3	2.56—	40,062.30	2.56—
Total	47,124	79,416.0	.....	\$80,199.82	
Average for five classes			1.685	.....	\$1.70
Total number of consumers at end of month					69,895
Total quantity of gas sold to all consumers except S. F. metered and street lighting					233,635.5 M cu. ft.
Total revenue all consumers except S. F.					\$226,530.35

Rate \$1.00 per M cu. ft.—Minimum charge \$.50 per meter.

EXHIBIT No. 63, P. 7.

Metropolitan Light & Power Co.

1570

*Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity
Used in Month of October, 1911.*

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quan- tity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	1,000	375.1	.38—	\$445.35	\$.45—
Second	854	739.4	.87—	632.20	.74+
Third	1,038	1,359.7	1.31—	1,156.90	1.11+
Fourth	1,054	1,883.3	1.79—	1,593.20	1.52+
Fifth	1,608	4,027.4	2.51—	3,403.45	2.12—
Total	5,554	8,384.9	.....	\$7,231.10	\$1.30
Average for five classes			1.51	.....	8,945
Total number of consumers at end of month					35,831.2 M cu. ft.
Total quantity of gas sold to all consumers except S. F. metered and street lighting					\$29,729.56
Total revenue all consumers except S. F.					30
Number of apartment house meters showing no consumption and no revenue					

Rate—\$.85 per M cu. ft.—Minimum charge \$.50 per meter.
Revenue on all classes taken from books.

San Francisco Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1911.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	6,367	2,277.7	.36—	\$3,093.10	\$.49—
Second	6,819	5,893.0	.86+	5,009.05	.73+
Third	10,558	13,846.2	1.32+	11,769.27	1.11+
Fourth	11,780	21,209.0	1.80	18,036.15	1.53+
Fifth	16,939	42,363.2	2.50+	36,008.72	2.13—
Total	52,463	85,589.1	.....	\$73,916.29	.....
Average for five classes			1.631	.....	\$1.409

Total number of consumers at end of month

Total quantity of gas sold to all consumers except S. F. metered and street lighting

75,632
237,641.9 M cu. ft.

Total revenue all consumers except S. F.

\$200,141.56

Number of apartment house meters showing no consumption and no revenue

96

Rate \$.85 per M cu. ft. Minimum charge \$.50 per meter.

EXHIBIT No. 63, P. 9.

Pacific Gas & Electric Co.

1572

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1912.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	9,110	2,203.3	.35+	\$4,143.15	\$.45+
Second	9,332	8,063.8	.87—	6,062.85	.65—
Third	13,764	17,928.3	1.30+	13,446.23	.98—
Fourth	14,177	25,482.6	1.80—	19,111.95	1.35—
Fifth	19,902	49,854.9	2.51—	37,391.18	1.88—
Total	66,285	104,552.9	.....	\$80,155.36	.....
Average for five classes			1.577	.....	1.209

Total number of consumers at end of month	94,138
Total quantity of gas sold to all consumers except S. F. metered and street lighting	297,541.0 M cu. ft.
Total revenue all consumers except S. F.	\$222,896.83
Number of apartment house meters showing no consumption and no revenue	363

Rate \$.75 per M cu. ft. Minimum charge \$.50 per meter.

Pacific Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1913.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue	Average revenue per consumer.
First	11,849	4,425.1	.37+	\$5,836.42	\$.49+
Second	11,489	10,404.3	.90+	8,843.66	.77—
Third	13,240	17,300.1	1.31—	14,705.09	1.11+
Fourth	18,162	32,590.4	1.79+	27,701.84	1.53—
Fifth	20,512	52,036.6	2.54—	44,231.11	2.16—
Total	75,252	116,756.5	.....	\$101,318.12	.....
Average for five classes			1.552	.....	\$1.346
Total number of consumers at end of month					102,396
Total quantity of gas sold to all consumers except S. F. metered and street lighting					309,049.4 M cu. ft.
Total revenue all consumers except S. F.					\$249,575.75
Number of apartment house meters showing no consumption and no revenue					584

Rate \$.85 per M cu. ft. Minimum charge \$.50 per meter.

1574

EXHIBIT No. 63, P. 11.

Pacific Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1914.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	12,252	4,726.4	.39—	\$6,100.48	\$.50—
Second	12,045	10,993.3	.91+	9,344.31	.78—
Third	13,525	17,643.5	1.30+	14,996.98	1.11—
Fourth	18,617	33,372.7	1.79+	28,366.80	1.52+
Fifth	20,873	53,201.6	2.55—	45,221.36	2.17—
Total	77,312	119,937.5	.....	\$104,029.93	.....
Average for five classes			1.551	.....	1.346
Total number of consumers at end of month					107,892
Total quantity of gas sold to all consumers except S. F. metered and street lighting					335,307.3 M cu. ft.
Total revenue all consumers except S. F.					\$279,744.47
Number of apartment house meters showing no consumption and no revenue					1,054

Rate \$.85 per M cu. ft. Minimum charge \$.50 per meter.

Pacific Gas & Electric Co.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of October, 1915.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	11,515	4,456.7	.39—	\$5,796.90	0.50+
Second	11,760	10,574.5	.90—	8,988.33	.76+
Third	13,585	17,648.0	1.30—	15,000.80	1.10+
Fourth	19,248	34,557.1	1.79+	29,373.54	1.53—
Fifth	22,861	58,370.9	2.55+	49,615.27	2.17+
Total	78,969	125,607.2	.....	\$108,774.84	.....
Average for five classes			1.59	.....	\$1.377

Total number of consumers at end of month..... 112,814
 Total quantity of gas sold to all consumers except S. F. metered and street lighting..... 399,520.9 M cu. ft.
 Total revenue all consumers except S. F..... \$318,476.54
 Number of apartment house meters showing no consumption and no revenue..... 702

Rate \$.85 per M cu. ft. Minimum charge \$.50 per meter.

Statement Correcting Recapitulation Sheet No. 14 of Exhibit No. 63.

Year.	Totals for five classes.					Apart. meters showing No. rev.. No. cons.	Totals for month except meter sold to city & con		
	No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Average revenue per consumer.		Consumers at end of month.	M cu. ft.	Avg. consu M cu
1905	42,320	70,042.9	1.655	\$69,975.25	\$1.653	None.	65,940	194,044.7	2.9
1906	22,654	42,143.6	1.86	35,820.87	1.581	do.	43,350	158,205.8	3.6
1907	31,018	55,621.4	1.793	47,289.41	1.524	do.	55,748	201,493.6	3.6
1908	39,839	67,884.7	1.704	68,540.44	1.72	do.	60,773	205,004.1	3.3
1909	41,422	71,303.4	1.721	72,009.95	1.738	do.	64,160	220,260.6	3.4
1910	47,124	79,416.0	1.685	80,199.82	1.70	do.	69,721	233,635.5	3.2
1911	52,463	85,589.1	1.631	73,916.29	1.49	96	75,445	237,641.9	3.1
1911	5,554	8,384.9	1.51	7,231.10	1.30	30	8,945	35,831.2	4.0
1912	66,285	104,552.9	1.577	80,155.36	1.209	363	93,922	297,541.0	3.1
1913	75,252	116,756.5	1.552	101,318.12	1.346	584	102,147	309,049.4	3.0
1914	77,312	119,937.5	1.551	104,029.93	1.346	1,054	107,648	335,307.3	3.1
1915	78,969	125,607.2	1.59	108,774.84	1.377	702	112,548	399,520.9	3.5
1916	82,942	126,283.6	1.523	109,416.69	1.319	697	111,908	359,229.3	3.2
Total for 12 years.....	663,154	1,073,523.7	19.424	\$958,678.07	\$17.347	3,526	972,255	3,186,765.3	39.4
Average for 12 years.....	55,263	89,460.3	1.619	\$79,889.92	\$1.445	....	81,022	265,563.8	3.2

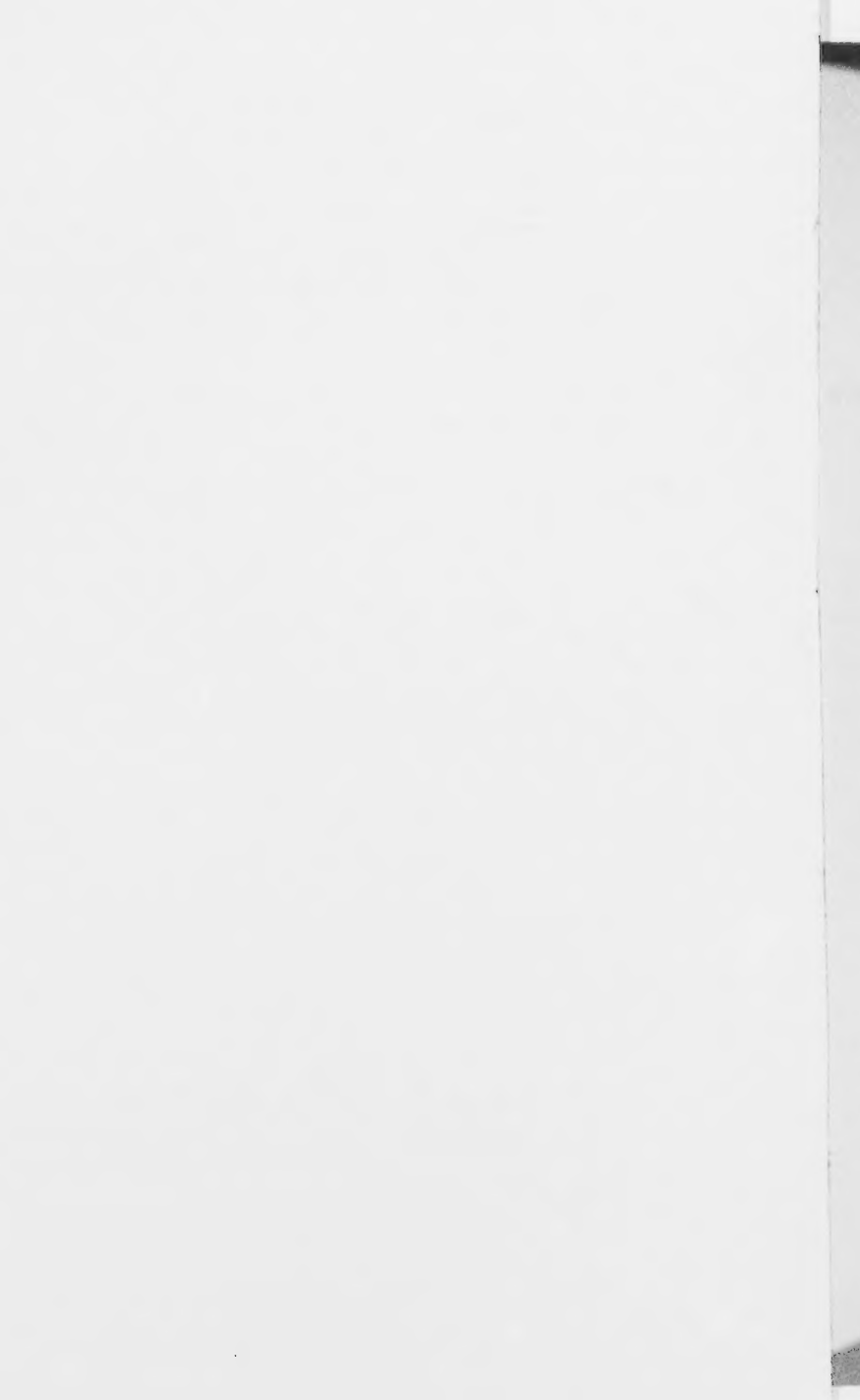
NOTE A.—The total amount charged on books as meter rental for October, 1915, was \$2,096.50. During this month, however, there was credit meter rent, charged in July, August and September of same year.

PLAINTIFF'S EXHIBIT NO. 69, PAGE 1.

Statement Correcting Recapitulation Sheet No. 14 of Exhibit No. 63.

Classes.		Totals for month except metered and street lighting sold to city & county of S. F.						Totals for five classes against totals for month.		
Revenue.	Average revenue per consumer.	Apart. meters showing No. rev., No. cons.	Consumers at end of month.	M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	Consumers.	M cu. ft.	Revenue.
\$69,975.25	\$1.653	None.	65,940	194,044.7	2.942	\$188,347.33	\$2.704	64.2%	36.1%	37.2%
35,820.87	1.581	do.	43,350	158,205.8	3.649	128,301.41	2.959	52.2	26.6	27.9
47,289.41	1.524	do.	55,748	201,493.6	3.614	161,549.66	2.897	55.6	27.6	29.3
68,540.44	1.72	do.	60,773	205,004.1	3.373	191,877.34	3.157	65.6	33.1	35.7
72,009.95	1.738	do.	64,160	220,260.6	3.433	211,307.32	3.293	64.5	32.3	34.1
80,199.82	1.70	do.	69,721	233,635.5	3.351	227,411.25	3.261	67.6	34	35.3
73,916.29	1.49	96	75,445	237,641.9	3.15	201,385.81	2.669	69.6	36	36.7
7,231.10	1.30	30	8,945	35,831.2	4.006	29,870.81	3.339	62.1	23.4	24.5
80,155.36	1.209	363	93,922	297,541.0	3.168	224,597.60	2.391	70.6	35.1	35.7
101,318.12	1.346	584	102,147	309,049.4	3.025	251,811.69	2.465	73.6	37.8	40.2
104,029.93	1.346	1,054	107,648	335,307.3	3.115	381,908.42	2.618	71.8	35.7	36.9
108,774.84	1.377	702	112,548	399,520.9	3.55	320,573.04	2.848	70.3	31.5	33.9
109,416.69	1.319	697	111,908	359,229.3	3.21	297,246.69	2.656	74.1	35.1	36.8
\$958,678.07	\$17.347	3,526	972,255	3,186,765.3	39.332	\$2,716,188.37	\$33.524	68.2%	33.7%	35.3%
\$79,889.92	\$1.445	....	81,022	265,563.8	3.278	\$226,349.03	\$2.794	....	....	....

October, 1915, was \$2,096.50. During this month, however, there was credited to consumers the sum of \$2,251.25 as a means of refunding excess



1577 Page 14 of said Exhibit No. 63, which contained only 14 pages, is a recapitulation sheet and is omitted here because of certain errors appearing therein, which were corrected by Exhibit No. 69.

During the period from 1908 to 1911, when there was litigation between the City and County of San Francisco and the San Francisco Gas and Electric Company involving the constitutionality of the rate-fixing ordinances, the revenue as shown in this Exhibit No. 63 was the full amount that was charged by the Company without deduction of the amount subsequently refunded to consumers pursuant to the decrees entered pursuant to the compromise agreement of May, 1911.

The Pacific Gas and Electric Company, at the time it put into effect the 85 cent schedule on September 1, 1913, sent notice to its consumers of the fact of the increase.

1578 J. R. BEARWALD, a witness called on behalf of plaintiff, testified as follows:

My name is J. R. Bearwald, I am 28 years of age, and am a clerk in the bookkeeping department of the Pacific Gas and Electric Company in its San Francisco District, of which department Mr. Oldis is the head.

I have prepared a statement, entitled "Statement supplementing Plaintiff's Exhibit No. 63," from the books of the company and it is, to the best of my knowledge and belief, correct.

This statement was admitted in evidence and marked Plaintiff's Exhibit No. 69. A true copy of said statement is in the words and figures following:

(Here follows pasted table marked page 1579.)

Pacific Gas and Electric Company.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of March, 1914.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	10,477	4,258.8	.41—	\$5,238.50	\$.50
Second	11,745	10,617.7	.90	9,025.05	.77—
Third	13,360	17,344.0	1.30—	14,742.40	1.10
Fourth	18,356	32,923.3	1.79	27,984.81	1.52
Fifth	20,333	51,769.0	2.55—	44,003.65	2.16
Total	74,271	116,912.8	.....	\$100,994.41	.....
Average for five classes			1.574	.....	\$1.359
Total number of consumers at end of month except C. & Co.					104,435
Total quantity of gas sold to all consumers except S. F. metered and street lighting					353,303.4 M Cu. Ft.
Total revenue all consumers except S. F.					\$295,819.63
Number of apartment house meters showing no consumption and no revenue					504

Rate, \$.85 per M Cu. Ft. Minimum charge, \$.50 per meter.

NOTE A.—First class includes all consumers who used not more than 600 cu. ft.

- Second do. do. more than 600 and not more than 1,000 cu. ft.
- Third do. do. more than 1,000 and not more than 1,500 cu. ft.
- Fourth do. do. more than 1,500 and not more than 2,000 cu. ft.
- Fifth do. do. more than 2,000 and not more than 3,000 cu. ft.

NOTE B.—Revenue for first class is computed on a basis of .50 per consumer as a minimum charge. Revenue for other classes is computed by multiplying quantity by rates.

Pacific Gas and Electric Company.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of March, 1915.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	11,415	4,743.9	.42—	\$5,707.50	\$.50
Second	13,312	12,022.4	.90	10,219.04	.77—
Third	14,401	18,696.5	1.30—	15,892.03	1.10
Fourth	18,856	33,767.7	1.79	28,702.55	1.52
Fifth	20,726	52,898.3	2.55	44,963.56	2.17—
Total	78,710	122,128.8	.....	\$105,484.68	.....
Average for five classes.....			1.552	.....	\$1.34
Total number of consumers at end of month except C. & Co.				111,489	
Total quantity of gas sold to all consumers except S. F. metered and street lighting.....				404,496.4	M Cu. Ft.
Total revenue all consumers except S. F.....				\$337,033.83	
Number of apartment house meters showing no consumption and no revenue.....				469	

Rate, \$.85 per M Cu. Ft. Minimum charge, \$.50 per meter.

PLAINTIFF'S EXHIBIT No. 69, PAGE 4.

Pacific Gas and Electric Company.

Statement Showing Quantity of Gas Sold to and Revenue Derived from Consumers Classified According to Quantity Used in Month of March, 1916.

Classes of consumers.	Number of consumers.	Quantity of gas, M cu. ft.	Average quantity of gas per consumer, M cu. ft.	Revenue.	Average revenue per consumer.
First	11,132	4,374.4	.39	\$5,566.00	\$.50
Second	12,345	11,183.4	.90	9,505.89	.77
Third	14,451	18,778.9	1.30—	15,962.07	1.10
Fourth	19,136	34,290.0	1.79	29,146.50	1.52
Fifth	22,373	57,020.6	2.55—	48,467.51	2.17—
Total	79,437	125,647.3	.....	\$108,647.97	.....
Average for five classes			1.582	.....	\$1.367
Total number of consumers at end of month except C. & Co.					112,205
Total quantity of gas sold to all consumers except S. F. metered and street lighting.					392,429.8 M Cu. Ft.
Total revenue all consumers except S. F.					\$325,030.62
Number of apartment house meters showing no consumption and no revenue.					1,305
Rate, \$.85 per M Cu. Ft. Minimum charge, \$.50 per meter.					

(Here follow pasteur tables marked pages 1583 and 1584.)

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Recapitulation, 1914-1916, Showing Quantity of Gas Sold to and

First class.

Company.	Year.	Rate per M cu. ft.	Min. chg., meter.	No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	No. of consumers.
Pacific Gas & Electric Co.....	1914	\$.85	\$.50	10,477	4,258.8	.41—	\$5,238.50	\$.50	11,745
do. do.	1915	.85	.50	11,415	4,743.9	.42—	5,707.50	.50	13,312
do. do.	1916	.85	.50	11,132	4,374.4	.39+	5,566.00	.50	12,345
Total for 3 years.....	....	....	....	33,024	13,377.1	1.22—	\$16,512.00	\$1.50	37,402
Average for 3 years.....	....	\$.85	\$.50	11,008	4,459.0	.41—	\$5,504.00	\$.50	12,467

Fifth class.

Company.	Year.	Rate per M cu. ft.	Min. chg., meter.	No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	No. of consumers.
Pacific Gas & Electric Co.....	1914	\$.85	\$.50	20,333	51,769.0	2.55—	\$44,003.65	\$2.16+	74,271
do. do.	1915	.85	.50	20,726	52,898.3	2.55+	44,963.56	2.17+	78,710
do. do.	1916	.85	.50	22,373	57,020.6	2.55—	48,467.51	2.17—	79,437
Total for 3 years.....	....	....	....	63,432	161,687.9	7.65—	\$137,434.72	\$6.50—	232,418
Average for 3 years.....	....	\$.85	\$.50	21,144	53,895.9	2.55	\$45,811.57	\$2.17—	77,473

NOTE "A."—First Class includes all Consumers who used not more than 600 cu. ft.

Second Class " " " " " more than 600 and not more than 1,000 cu. ft.

Third Class " " " " " " " 1,000 " " " " 1,500 " "

Fourth Class " " " " " " " 1,500 " " " " 2,000 " "

Fifth Class " " " " " " " 2,000 " " " " 3,000 " "

NOTE "B."—Revenue for First Class is computed on a basis of \$.50 per Consumer as a Minimum charge. Revenue for other classes is computed

PLAINTIFF'S EXHIBIT No. 69, PAGE 5.

Sold to and Revenue Derived from Consumers Classified According to Quantity Used Month of March—All Years.

Second class.					Third class.						
No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	No. of consumers.	Quantity of gas, M cu. ft.
11,745	10,617.7	.90+	\$9,025.05	\$.77—	13,360	17,344.0	1.30—	\$14,742.40	\$1.10+	18,356	32,923
13,312	12,022.4	.90+	10,219.04	.77—	14,401	18,696.5	1.30—	15,892.03	1.10+	18,856	33,767
12,345	11,183.4	.90+	9,505.89	.77+	14,451	18,778.9	1.30—	15,962.07	1.10+	19,136	34,290
37,402	33,823.5	2.71+	\$28,749.98	\$2.30+	42,212	54,819.4	3.90—	\$46,596.50	\$3.31+	56,348	100,981
12,467	11,274.5	.90+	9,583.33	.77—	14,071	18,273.1	1.30—	\$15,532.17	1.10+	18,783	33,660

Totals for five classes.					Totals for month except metered and street lighting sold to city & county of S. F.						
No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	Apart. meters showing No. rev., No. cons.	Consumers at end of month.	M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	Totals or av Consumers.
74,271	116,912.8	1.574	\$100,994.41	\$1.359	504	104,435	353,303.4	3.387	\$295,819.63	\$2.832	71.1%
78,710	122,128.8	1.552	105,484.68	1.34	469	111,489	404,496.4	3.628	337,033.83	3.023	70.6
79,437	125,647.3	1.582	108,647.97	1.367	1,305	112,205	392,429.8	3.497	325,030.62	2.897	70.8
232,418	364,688.9	4.707	\$315,127.06	\$4.068	2,278	328,129	1,150,229.6	10.516	\$957,884.08	\$8.758	70.8%
77,473	121,563.0	1.569	\$105,042.35	\$1.356	759	109,376	383,409.9	3.505	\$319,294.69	\$2.919	....

is computed by multiplying quantity by rates.

mers Classified According to Quantity Used Month of March—All Years.

Revenue.	Avg. rev. per consumer.	Third class.					Fourth class.				
		No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.	No. of consumers.	Quantity of gas, M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.	Avg. rev. per consumer.
25.05	\$.77—	13,360	17,344.0	1.30—	\$14,742.40	\$1.10+	18,356	32,923.3	1.79+	\$27,984.81	\$1.52+
19.04	.77—	14,401	18,696.5	1.30—	15,892.03	1.10+	18,856	33,767.7	1.79+	28,702.55	1.52+
05.89	.77+	14,451	18,778.9	1.30—	15,962.07	1.10+	19,136	34,290.0	1.79+	29,146.50	1.52+
49.98	\$2.30+	42,212	54,819.4	3.90—	\$46,596.50	\$3.31+	56,348	100,981.0	5.38—	\$85,833.86	\$4.57—
83.33	.77—	14,071	18,273.1	1.30—	\$15,532.17	1.10+	18,783	33,660.3	1.79+	\$28,611.29	\$1.52+

Totals for month except metered and street lighting sold to city & county of S. F.										
Revenue.	Avg. rev. per consumer.	Apart. meters showing No. rev., No. cons.	Consumers at end of month.				Avg. rev. per consumer.	Totals or five classes against totals for month.		
			No. cons.	M cu. ft.	Avg. per consumer, M cu. ft.	Revenue.		Consumers.	M cu. ft.	Revenue.
34.41	\$1.359	504	104,435	353,303.4	3.387	\$295,819.63	\$2.832	71.1%	33.1%	34.1%
34.68	1.34	469	111,489	404,496.4	3.628	337,033.83	3.023	70.6	30.2	31.3
47.97	1.367	1,305	112,205	392,429.8	3.497	325,030.62	2.897	70.8	32.1	33.4
27.06	\$4.068	2,278	328,129	1,150,229.6	10.516	\$957,884.08	\$8.758	70.8%	31.8%	32.9%
12.35	\$1.356	759	109,376	383,409.9	3.505	\$319,294.69	\$2.919	....	....	....

Recapitulation, September 1913, to August, 1914, Showing Number of Consumers Using Not More Than

Month.	0 cu. ft.	100 cu. ft.	200 cu. ft.	300 cu. ft.	400 cu. ft.	500 cu. ft.	600 cu. ft.	700 cu. ft.	800 cu. ft.	900 cu. ft.	1,000 cu. ft.
Sept., 1913.....	2,537	115	2,528	214	3,013	181	3,836	201	4,628	188	5,5
October	2,364	159	2,420	235	3,112	205	4,096	246	4,972	198	5,9
November	1,465	117	1,753	181	2,283	208	3,272	227	4,199	206	4,8
December	1,399	103	1,559	144	2,369	151	3,458	155	4,426	136	5,1
Jan., 1914.....	1,211	94	1,442	161	2,249	122	3,404	131	4,242	136	4,8
February	1,087	124	1,681	170	2,654	185	4,114	158	5,165	155	5,8
March	1,461	122	1,857	165	2,905	189	4,282	168	5,310	149	6,1
April	1,419	136	2,094	196	2,960	195	4,219	173	5,095	171	6,0
May	1,633	156	2,381	230	3,258	232	4,449	201	5,246	215	6,2
June	1,975	177	2,651	264	3,613	231	4,792	217	5,819	188	6,6
July	2,503	146	2,951	229	3,775	218	4,924	206	5,749	183	6,6
August	2,587	167	3,021	240	3,904	234	5,014	245	6,052	194	6,9
Total for 12 months.....	21,641	1,616	26,338	2,429	36,095	2,351	49,860	2,328	60,903	2,119	70,7
Average for 12 months.....	1,803	135	2,195	202	3,008	196	4,155	194	5,075	177	5,8

Month.	2,100 cu. ft.	2,200 cu. ft.	2,300 cu. ft.	2,400 cu. ft.	2,500 cu. ft.	2,600 cu. ft.	2,700 cu. ft.	2,800 cu. ft.	2,900 cu. ft.	3,000 cu. ft.	Total consumers.
Sept., 1913.....	86	5,048	98	4,495	71	3,971	62	3,536	34	3,183	73,457
October	98	5,248	73	4,714	72	3,900	60	3,408	54	2,896	75,787
November	93	4,844	95	4,584	95	4,126	96	3,629	76	3,338	67,381
December	95	4,790	93	4,258	93	3,795	72	3,493	59	3,192	66,039
Jan., 1914.....	94	4,463	67	4,184	69	3,839	80	3,540	44	3,097	62,903
February	103	4,764	75	4,233	78	3,736	67	3,344	49	3,033	69,831
March	109	5,075	93	4,503	68	3,909	72	3,393	72	3,039	74,775
April	97	4,980	85	4,560	85	4,168	80	3,538	58	3,069	75,366
May	118	5,197	108	4,402	77	4,034	83	3,462	68	3,005	77,562
June	111	5,013	103	4,335	65	3,739	61	3,147	69	2,739	79,417
July	104	4,996	105	4,318	103	3,871	90	3,201	69	2,700	80,140
August	109	5,079	84	4,236	76	3,820	83	3,000	59	2,600	81,900
Total for 12 months.....	1,217	59,497	1,079	52,822	952	46,908	906	40,691	711	35,891	884,558
Average for 12 months.....	101	4,958	90	4,402	79	3,909	76	3,391	59	2,991	73,713

NOTE A.—Revenue for consumers using not more than 3,000 cubic feet is computed by multiplying M cubic feet by 85 cents except on fir

NOTE B.—Number of Consumers using no gas includes apartment house meters showing no consumption and no revenue.

NOTE C.—The total number of consumers using not less than 3,000 cubic feet of gas during the month of October, 1913, as shown on this exhibit by the fact that in this exhibit there are included 584 apartment house meters showing no consumption and no revenue, while in exhibit No. 63 said consumers.

ing Not More Than 3,000 Cubic Feet of Gas Per Month, Classified According to Quantity Used.

900 cu. ft.	1,000 cu. ft.	1,100 cu. ft.	1,200 cu. ft.	1,300 cu. ft.	1,400 cu. ft.	1,500 cu. ft.	1,600 cu. ft.	1,700 cu. ft.	1,800 cu. ft.	1,900 cu. ft.	2,000 cu. ft.
188	5,564	171	5,822	140	6,010	120	5,956	117	5,825	99	5,608
198	5,936	174	6,263	168	6,286	151	6,366	110	5,921	114	5,768
206	4,836	172	5,267	162	5,467	126	5,505	137	5,347	138	5,337
136	5,155	151	5,340	122	5,513	129	5,358	112	5,187	99	5,033
136	4,813	121	5,035	129	5,099	99	5,064	101	4,917	82	4,774
155	5,853	140	6,137	136	5,763	149	5,777	119	5,540	116	5,126
149	6,118	155	6,559	148	6,367	131	6,353	121	5,991	130	5,761
171	6,046	186	6,312	166	6,485	152	6,412	146	6,123	153	5,807
215	6,275	208	6,640	185	6,726	181	6,508	178	6,248	130	5,728
188	6,629	191	6,971	153	7,021	164	6,708	121	6,255	113	5,782
183	6,601	185	6,811	154	6,869	164	6,561	142	6,251	145	5,816
194	6,964	191	7,095	176	7,075	169	6,883	141	6,480	103	5,819
2,119	70,790	2,045	74,252	1,839	74,681	1,735	73,451	1,545	70,085	1,422	66,359
177	5,899	170	6,188	153	6,223	145	6,121	129	5,840	119	5,530

No. ft.	Totals for all classes.			Totals for months except metered and street lighting sold to city & county of S. F.			Totals for consumers using 3,000 cubic feet against totals for months.		
	Total consumers.	M cu. ft.	Revenue.	Consumers.	M cu. ft.	Revenue.	Consumers.	M cu. ft.	Revenue.
83	73,457	113,840.5	\$99,424.62	101,140	309,055.3	\$255,413.24	72.6%	36.8%	38.9%
96	75,787	116,476.5	101,581.52	102,148	309,049.4	251,811.69	74.2	37.7	40.3
98	67,381	109,793.3	95,076.36	103,218	373,082.9	311,539.50	65.3	29.4	30.5
92	66,039	106,380.2	92,070.95	103,958	406,986.7	341,255.01	63.5	26.1	27.0
97	62,903	102,140.4	88,314.11	104,347	441,691.9	368,422.32	60.3	23.1	24.0
93	69,831	109,856.6	94,966.83	104,351	383,537.9	320,475.84	66.9	28.6	29.7
99	74,775	116,912.8	101,246.40	104,435	353,303.4	295,819.63	71.6	33.1	34.2
99	75,366	118,282.5	102,491.12	104,533	340,826.0	285,694.57	72.1	34.7	35.8
05	77,562	119,550.6	103,835.52	104,466	328,537.3	275,485.73	74.2	36.4	37.7
99	79,417	118,674.0	103,420.85	104,490	314,018.2	263,339.41	76.	37.8	39.3
00	80,140	118,736.1	103,838.82	104,795	305,588.0	257,097.46	76.5	38.9	40.3
00	81,900	119,872.7	104,902.38	105,687	293,665.3	247,136.80	77.5	40.8	42.4
91	884,558	1,370,516.2	\$1,191,169.48	1,247,567	4,159,342.3	\$3,473,511.20	70.9%	33.0%	34.3%
91	73,713	114,209.7	\$99,264.12	103,964	346,611.9	\$289,459.27			

cents except on first seven classes—revenue for which is computed on a meter rental basis of 50 cents per consumer.

shown on this exhibit is 535 more than is shown for the same month in exhibit No. 63, sheet 14. This difference is accounted for in part exhibit No. 63 said apartment house meters are shown in a separate column, and in part by clerical errors resulting in a net difference of 49

1585 Page 1 of plaintiff's Exhibit No. 69 has been prepared as a substitute for the recapitulation sheet (No. 14 of Exhibit No. 63) and in its compilation certain errors which appeared in sheet 14 of Exhibit No. 63 have been corrected. In Exhibit No. 63 the total number of consumers or installed meters shown on pages 1 to 13 for the month of October in each of the years from 1905 to 1916 included the number of meters which were used for measuring gas delivered to the City and County of San Francisco at various places. These numbers were carried forward into the recapitulation sheet (page 14 of Exhibit No. 63) although the caption indicated that they were excluded. Furthermore, in stating the revenue from all consumers in Exhibit No. 63 we inadvertently failed to include the amounts charged as meter rental. The remaining errors in sheet 14 of Exhibit No. 63 appeared in the results of computations and were attributable to the two errors which I have specifically mentioned. In compiling page 1 of Exhibit No. 69 I have deducted from the total number of consumers at the end of the month of October in each of the years from 1905 to 1916 the number of the meters used for measuring gas delivered to San Francisco and I have added to the amounts of revenue shown in Exhibit No. 63 the amounts charged for meter rental.

Page 1 of Exhibit No. 69 is to be read and interpreted in connection with Exhibit No. 63. The five classes of consumers 1586 referred to in the caption of page 1 of Exhibit No. 69 are the five classes which are defined on page 1 of Exhibit No. 63 and the figures given have reference to the month of October in each of the years from 1905 to 1916 inclusive.

In explanation of Note A appearing on page 1 of this exhibit I will state that on July 1, 1913, the company attempted to raise its minimum charge from 50 cents to 85 cents and that minimum charge was filed as part of the rate schedules with the Railroad Commission on August 9 of that year when the Public Utilities Act became operative in San Francisco. Subsequently, the Railroad Commission ordered that the minimum charge be reduced, and the company acted upon that order and refunded the difference between the 85 cent and the 50 cent minimum charge, collected during the months of July, August, and September of that year.

The records of the plaintiff show that the amounts of gas sold in the months of March and October of each year are respectively approximately one twelfth of the total amount sold in the same year.

Sheet No. 6 of said Exhibit No. 69 shows for the period beginning with September, 1913, and ending with August, 1914, the entire number of consumers who used not more than 3,000 cubic feet of gas per month and also classifies those consumers according to the amount of gas used by them. This sheet shows the number 1587 of consumers who used 100 feet per month, those who used 200 feet per month, and so on up to 3,000 feet per month.

You will note, upon examining sheet No. 6 of Exhibit No. 69, that the number of consumers using an even number of hundred cubic feet of gas is considerably larger than the number using an odd hundred number. This is due to the fact that up to 1916 it was

the practice of the statement takers to read the meters as near the even numbers as possible in order to make the computing of the bills as much of a memory proposition as possible. That practice was changed in 1916. If the meter showed that the number of cubic feet of gas consumed had not gone past the odd number, the statement was taken as of the smaller even number; if it had gone past the odd number, the statement was taken as of the next higher even number. For the purpose of making opening account and closing account statements the meters were read at their face amount, and that accounts for the fact that there are a few consumers shown in the odd numbered hundred columns. The dials on the meters are graduated only to hundreds. The registration on the meter dials is continuous and the amount of gas used in a given period is the difference between the amount registered at the beginning and the amount registered at the end of the period.

In explanation of Note A on sheet 6 of Exhibit No. 69, which is to the effect that revenue for consumers using not more than 3,000 cubic feet of gas is computed by multiplying 85 cents by the number representing the quantity of gas expressed in units of a thousand cubic feet, except the first seven classes, revenue for which is computed on a meter-rental basis of 50 cents per consumer. This tabulation is based on a tally of consumers using the quantities indicated and was not accomplished by taking off the amount of money charged against each consumer; but, for the purpose of approximating the revenue, it has been estimated that all consumers who used 600 feet or less paid the minimum charge of 50 cents per month per consumer. The charge for 600 cubic feet at \$.85 per 1,000 would be fifty-one cents. For the rest of the classes the amount of revenue has been computed by multiplying the rate or price, \$.85 per 1,000 cubic feet, by the number representing the quantity of gas used.

1589 Mr. GEORGE C. HOLBERTON, a witness recalled on behalf of plaintiff, testified as follows:

On page 3 of plaintiff's Exhibit No. 50 appears a list of consumers who, during the year 1912-13, were given special rates for gas which were lower than the ordinance rate of 75¢ per 1,000 cubic feet. This list shows that J. A. Folger & Co., M. J. Brandenstein and Co., Hills Bros., and A. Shilling & Co. were given the same rate which varied according to the amount of gas used from 75¢ to 65¢ per 1,000 cubic feet. That was known to us as a coffee roasting rate. The reason for giving that rate was that in 1912 and previous to that date we had been seeking in every way to obtain consumers who used large amounts of gas outside of the ordinary domestic lighting and cooking uses. The reason for trying to obtain these consumers was that, in the first place, it was profitable business and, in the second place, the use of gas by the ordinary householder was diminishing very rapidly due to the advent of the Welsbach burner and the introduction of the electric light. In the earlier days we were able to maintain gas lighting because of the increased efficiency of the Welsbach mantle plus the fact that it was not an easy matter to equip the then ex-

isting house with electric lights. As new houses were built, we had to meet the competition of the electric light, not only on the basis of cost, convenience, cleanliness and coolness, but also because
1590 the modern house was not piped for gas for lighting purposes but only with what we term the "fuel run" to the kitchen.

In order to obtain consumers of gas for lighting purposes, we have maintained solicitors among the architects and owners and have kept two men in the Builders' Exchange who maintain an exhibit with the building materials people with the idea of educating the people to the piping of houses so that we might have the possibility of their utilizing gas whenever we could. But, with all these efforts, the use of gas for lighting purposes by the ordinary householder has been steadily diminishing. Of course, we do not know the exact proportion of gas that is used for lighting purposes, but we assume and know that the diminution is due to the use of electricity for lighting purposes. It was necessary, therefore, to turn to some other field. There are three ways we can increase our business. One is by extending our mains which we have done until it is not possible in the City and County of San Francisco today to build a home where gas cannot be obtained; the second is by increasing the use of gas by our existing consumers, and I think we have come pretty close to the point of saturation so far as the use of gas for cooking and heating water is concerned; and the third is by creating an entirely new field for the use of gas. To create this new field, we have made special

rates to encourage the use of gas in industrial works. The
1591 competition with wood, coal, coke and oil is extremely keen, particularly with the pre-ent price of oil. We naturally turned first to those industries which apply the fuel in a gaseous form and which require very close regulation of heat and the maintenance of a very uniform temperature. That is particularly true of the business of the companies to which I referred who maintained coffee roasters. We were successful in securing quite a large amount of business in that line, as this statement shows. A close and uniform regulation of heat is much easier obtained with artificial gas than with either coal or wood or even fuel oil.

In coffee roasting, the ovens must be kept revolving. In most of those industries there is a thermometer which gives an exact indication of the temperature in the ovens and in this way the temperature on the coffee beans can be regulated quickly and nicely. The reason for this particular rate at this time was due to the fact that when we first started to obtain this business we had a sliding scale which ran from 80¢ to 65¢ per 1,000 cubic feet. The introduction of the 75¢ rate by the Board of Supervisors in 1912 made it necessary for us to cut the top of the old rate. But the value of the product has quite a material bearing on our ability to secure that business. If, for any reason, they had wanted to put small castings
or something of that kind through a roasting process, they
1592 probably could not have paid us these rates because the value of the product would not stand it. The rates which we charged such large consumers as the coffee roasters were as high as the traffic would bear. In all those cases, we started in with the
then price for gas and began our negotiations. The fact that a rate

was made for coffee roasting is purely the result of the fact that we were not able to get the business without making such a rate. Those rates were made after very careful negotiations, sometimes extending over two or three years before we were successful in obtaining the business. You cannot convince the owners of such industries by mere argument. You must, in the first place, spend your time, your efforts and your money in proving that it is possible to do the work with gas. The men who have the first say are generally the practical operators in the plants. And if they have been working with coal, oil or wood all their lives, it is quite a hard job to get them to consider the thing at all. And then, when your engineers have done that, you have to sit down with the manager of the enterprise and show him that he can afford, by reason of cleanliness, convenience and all of the other arguments that you can think of, to pay you the rate that you finally make him. That rate is based on what the traffic will bear, and it must still leave us a good profit to ourselves. It is necessary, in all these cases, to make a considerable increased income in gross dollars because it is the large amount of

1593 of money that we now receive from these industrial rates that enables us to maintain the present low top rate to smaller concerns.

Those rates for coffee roasters were maintained unchanged during the next two years. A. Shilling & Co. evidently ceased to roast sometime in the latter part of 1912.

This list on page 3 of said exhibit also shows that S. Blum, California Baking Company, N. Louston, St. Ignatius College, John Kitchen Jr. Co., C. A. Murdock Company and Mrs. J. J. Anderson were also given a rate that was lower than said ordinance rate. Prior to 1906 the San Francisco Gas and Electric Company was in very keen competition with the Metropolitan Company. The San Francisco Gas and Electric Company, particularly in the territory supplied by the Metropolitan Company, used a sliding scale of rates which was similar in the last four steps of the scale to the scale of rates given to the last mentioned consumers as shown on said page 3. Those consumers were all in a competitive territory and became consumers under those competitive conditions. When the rate in 1912-13 changed from 80¢, we lumped the first steps of the then existing scale and made it 75¢ for the first 29,900 cubic feet.

S. Blum was a confectioner and maintained a candy furnace.

There were other competitive conditions at the time of making

1594 this report besides the competition between the two companies.

The uses for gas were increasing and in order to encourage Blum to use gas and to continue to use gas in the candy furnace after the advent of oil, it was necessary to make some concession in the rate.

The California Baking Company was a bakery. The gas that was sold to it at that time was not used under the large bake ovens for the purpose of baking bread as it had not proved successful. It was used under special bake ovens for baking cakes and pies. We were never entirely able to convince that company that it could use gas for baking bread, but my recollection is that under our rate of

1915-16 the California Baking Company is materially increasing its consumption of gas.

Going back for just a moment; I have before me the rate from October 1, 1905, to July 1, 1908. I think that is set forth in Exhibit No. 40. You will notice that that starts with an 85¢ rate for 10,000 cubic feet and down to 80¢ for 19,900 cubic feet. When the rate was made 75¢ for the top, we had to add the 10,000 to the 19,900 cubic feet and put that under the maximum rate we were allowed to charge.

M. Louston maintains a French laundry. High pressure steam is used in French laundries for heating mangles and other laundry machinery. The ordinary low pressure steam, such as is supplied by some companies in street mains, cannot be put to such uses due
1595 to the fact that the temperature of the steam is too low. We felt that it was quite a nuisance in small laundries to obtain the necessary steam at high pressure and we thought that, if we could find a way to generate steam by gas and thus eliminate the nuisance of soot and the necessity of keeping up a fire and other inconveniences, even though the cost might be a little more, we might be able to find in the French laundry a case where the traffic would stand a rate that we could make them and also obtain a profit to ourselves. So we entered that field with a device known as the "Kane boiler." This was one of the first installations that we used with gas for fuel, the first result of a very strong effort begun in 1912 to obtain industrial consumers. I think I can give you some idea of what that possibly leads to. By the end of 1913 we had installed in laundries 15 of these high pressure boilers. By 1916 we had increased that business to 69. In view of the statements given in this exhibit as to consumption of gas, that shows that it was a very valuable asset in the way of a new development.

In the case of M. Louston, I think we got a rate that was a little too high; in other words, that was a starter and an experiment. If you will look at the sheet you will find that it did not last very long. M. Louston threw the boiler out. That resulted, though, in giving
us enough information so that later on, when we were able to
1596 make rates, we tackled the next fellow on a little better basis and we have succeeded in getting several others.

It requires a tremendous effort to get these people. In the case of G. Nozawa shown on page 7 of this exhibit we had to make his rate a little different. We had to coax these people by telling them that they would have to pay the regular rate unless they became very good consumers, and by telling them what wonderful consumers they were going to be, and that we could give them a lower rate only when they exceeded a certain amount. You will notice he pays a regular rate up to 100,000 cubic feet a month. Over that he pays 70¢. In other words, he had to use \$70.00 worth of gas before he got any special rate. It is a case of work, salesmanship and financing. I recall this particular case. He was a poor, little Japanese and he thought he might be able to stand the rate but he could not afford the installation and so we had to spend \$512.40 to put in the boiler for him and we let him pay it back at so much a month. We cer-

tainly charged what the traffic would bear from those people. It is not only a question of getting this class of people, but it is a question of preventing them from throwing your system out when they begin to get the bills.

St. Ignatius College operated under an old contract at the old rate that was fixed in competition with the Metropolitan Company. St. Ignatius College at that time was at the corner of 1597 Van Ness and Grove in the competitive territory. Those contracts of the San Francisco Gas and Electric Company read that if the consumer moved to a point in the city within 100 feet of our mains he was entitled to have his contract transferred to that point of consumption. On that basis the St. Ignatius College claimed the right to complete their contract when they moved farther out on Hayes St. at the rate which was made in 1906 under competitive conditions, and, in view of the character of the institution, the old rate was maintained.

The John Kitchen Company and the Murdock Company were in the printing business and were given rates based on contracts let under competitive conditions.

Mrs. Anderson ran a four story apartment house of about 30 or 40 apartments on Haight Street just out of the competitive territory. She held one of those old contracts and insisted on maintaining it to the time we put in force the 1915-16 rate and even after that.

The Illinois Pacific Glass Co. has a rate that corresponds pretty closely to the coffee roasting rate, except that we have added a maximum charge for consumptions under certain amounts. The steps seem to be the same until they get to the maximum. The Illinois

1598 Pacific Glass Co. has some process in the blowing of glass in which they utilize steam in place of the human element. It does not require any enormous volume, but it does require a considerable pressure to take care of the glass blowing molds. A very close regulation of temperature is required in the molds against which the bottles are blown, as any change of temperature is apt to crack the bottle or whatever is being blown and also tends to make a variation in the thickness of the finished product. It is a more delicate and sensitive operation than the ordinary boiler use. As we did considerable business with them electrically and consequently were in touch with them, we got them to let us experiment and see what we could do. We put in the Kane boilers that were used in the French laundries. The consumption in the case of the Illinois Pacific Glass works was very much larger than that of a laundry. If you will refer to sheet 4 of said exhibit, the first month's bill for gas was \$576.15 which compares very favorably with almost every other one shown on that sheet. In order to get that business, it was necessary that we give them a rate of 60¢ for all gas consumed over 300,100 cubic feet a month. I doubt if we would have been able to maintain the business at that rate if it had not been for the introduction of future rates in later years. The company was afraid that in certain seasons of their bottling it might not have the use for as much gas as would bring them down onto those lower scales. They had figured out very carefully what their traffic would bear. We

1599 had to agree that the maximum charge for consumption under 250,000 cubic feet would not be more than \$162.50. If you work that out, you will find that that is arrived at due to the sliding scale overlap. The great difficulty that we have had in all so-called sliding scales has been the question of the overlap. A sliding scale is a scale in which the rate per unit supplied automatically changes when the consumption increases as distinguished from a block scale such as we use now in which you pay a certain price for a given number of units of the commodity and then for the next given number you pay a different price after having paid your price in the first block. The advantage of the block scale over the sliding scale is that if you use more of the commodity your net unit rate must be less. In the sliding scale you arrive at the ridiculous position that, if you use almost your first block but not quite, you would be charged an amount of money greater than if you had deliberately taken and wasted the commodity so as to get a greater usage and the advantage of the next step. In many contracts where people have had that experience, they insisted on some clause to take care of it. As a matter of policy, however, some years ago I made a rule with the bookkeepers that they should never charge a greater number of gross dollars for a lesser amount of the product. For instance, if you take 100,000 feet at 75¢ a thousand, the 100,000 feet would cost \$75.00. In the event of the consumption going over 100,000 feet, the rate was reduced to 65¢ so that for 101,000 feet you would pay only \$65.65 instead of paying \$75.00 for 100,000 feet.

On page 104 of said exhibit are shown certain consumers who were granted flat rates. The largest one is the American Can Company. Now, that is a very excellent illustration of the great difficulty of obtaining industrial business in the face of competition. All but the first two contracts with the American Can Company I negotiated myself and I remember the trouble very well indeed. A contract was entered into with the American Can Company on August 1, 1906, and provided for a sliding scale with a maximum of 85¢. We obtained that contract on a rising oil market. In 1908 and 1909 oil went about as high as it got and then began to go down. In 1910 when we had to negotiate a new contract with the American Can Company we were a little uncertain as to the effect of the price of oil and we negotiated a contract for only one year. In 1911 the price of oil was still declining somewhat. We naturally had reason to believe that it was going lower because the price of oil to the Pacific Gas and Electric Company in larger quantities was declining faster than the ordinary retail price of oil at that time. I negotiated a contract at that time with the manager of the American Can Company. We were obliged to give them a rate of 60¢.

1601 I even tried to get them to guarantee that in consideration of that they would use 12,000,000 feet a year. That would be an average of a million a month. However, they would not stand for that. That perhaps illustrates the way in which these prices have to follow the prices of your competitor, whether it is coal, or wood, or oil.

Then the next time that the contract came up with the American Can Company was when the large plant was built over at the Potrero; that contract was negotiated on the 31st day of December, 1915. That was after the adoption of the block schedule. We were unable to get the business of the American Can Company on the block schedule as it then existed. At that time I thoroughly made up my mind to the fact that this block schedule of 1915-16 was the only real non-discriminatory method of making a rate. We fought there for months and months. The consumers, and particularly the large consumers, are always adverse to making any kind of a scale; when you talk block scale to them they always measure it by the top. If you have a scale that runs from 75¢ to 10¢, they never talk about the 10¢, they always talk about the top rate. After carefully going into additional apparatus that the American Can Company was going to install in its new plant over at the Potrero, and realizing the fact that this was the largest individual consumer we have on our books without any exception, and that they were moving over to within a block of our holder, it seemed that it would be an economic crime to lose such a piece of business, because there you were

1602 supplying a man where there was not any cost to you, except the cost in the holder; all you could save if you lost the business would be a few gallons of oil. I really made a special effort at that, and I thought I had it about ready to close on our block scale, but I discovered then that the American Can Company had found out that at Cleveland or at Detroit there was a complete gas-making plant that was out of use, and they threatened to move that out here and make their own gas, because of the enormous volume that they were going to use. Those negotiations were conducted during the year 1915. If my memory serves me right, it was probably fully a year's negotiation. You will notice, if you look at the price of oil, that the retail price of oil in 1915 was lower than at any other time since 1906. That made the negotiations extremely hard. I used every argument I could think of and I finally closed by adding a block for gas over 700,000 cubic feet a month at 40 cents a thousand. The regular schedule in force at that time was as follows:

1603 For the first 16,500 cubic feet, 85¢ per 1,000 cubic feet; for the next 33,500 cubic feet, 70¢ per 1,000 cubic feet; for the next 100,000 cubic feet, 65¢ per 1,000 cubic feet; for the next 200,000 cubic feet, 60¢ per 1,000 cubic feet; for all over 350,000 cubic feet, 55¢ per 1,000 cubic feet. The schedule covered a total of 700,000 cubic feet. I said to them, "Use as much more; in other words, double that 700,000, and when you pass that point we will let you have the gas for 40¢". That meant a reduction of probably a cent or a cent and a half in the figures that we had quoted in the other rate, but it was just enough to turn the scale. The average rate up to and including 700,000 cubic feet was 59.28¢ per 1,000 cubic feet. There were no special rates in 1915-16, because this schedule practically fitted everybody. We have about six consumers that have broken the 700,000 foot mark and been given the same schedule allowed to the American Can Company

1604 There are a few other flat rates, notably Mr. Adler. That is an extreme case. It is under the name of N. M. Adler, but it refers to Mr. Adler of the Bay State restaurant, on O'Farrell Street, between Powell and Mason. We were in very keen competition at the time with the United Light & Power Company on the question of the sale of steam for heating purposes. We then began a very active campaign to try and see if we could not, by means of superior economy and application, obtain some of the heating business with gas, so that we could retain our electric business as well. We had the matter up with Mr. Adler. You will notice if you look at the reports there that for a heating proposition it is a very heavy usage. Even in July, you will see that his bill was over \$83.00. We were able for a long time to stave off the loss of that revenue, both in gas and electricity, by the introduction of gas heating; but we could not finally hold it. It was another case where that was as low as we would care to go at that time; but the competition of steam from the city service and his own oil plant threw it out and it tapered off to nothing and you don't find it here again.

The California Fruit Cannery Association is a story very similar to that of the American Can Company. It is an industrial proposition pure and simple. It is a manufacturing plant in which they of course weigh very carefully the cost of each individual item that goes to make up the total cost of their product. It was a very difficult thing to get their business. I think probably the only

1605 thing that enabled us to get even a rate of 60¢ per thousand is the fact that the California Fruit Cannery Association is a seasonal occupation. We have there a little bit of advantage in that we save them interest and depreciation in an isolated boiler plant over a period of probably 8 or 9 months of the year. If you look at the California Fruit Cannery Association consumption, you will find an enormous variation; in other words, at their various locations their bill will run up as high as \$300.00 and down as low as \$11.00. Their principal consumption is in May, June and July, when they are canning fresh vegetables, and things of that kind. It comes at a period of time when your heating consumption is very low; it tends to iron out your annual average.

The two remaining ones are the United States Mint and the City and County of San Francisco. The United States Mint was a heavy user. It was our policy right along to extend to the federal government the same courtesies extended to the municipal government. There was a great deal of competition. During the first or second year we were in there they were doing additional work in the Mint with crucibles. I am not familiar enough to know the exact arrangement, but in the reduction of precious metals they were using a crucible operation. Gas is well adapted to that, due to the ease of control and the direction of the flame impinging on the crucible. It was easier to handle with gas than with any form of coal or wood fire, but it is not so true in the case of oil. The United States

1606 Mint has its own steam plant and it has a turbine installed. It was put in by the government sometime ago. They con-

templated the use of oil for that purpose. By making them this special rate, we continued with them until we got our final rate, and we have been able to hold the business ever since. It has grown very steadily. Many of these enterprises have to be nursed along. If you get a man to use your commodity you are successful with him when his business grows; the earlier you get into any of these new uses the better off you are; in other words, at the time when this account opens, you will see that our business with the Mint only amounted to about \$224.00 a month. I think that is about the fourth in size. That business has been growing right along. I think it was at a maximum just before the opening of the Panama-Pacific Exposition; at that time the Mint removed some of its apparatus and went out to the fair; in June, 1914, it had increased more than three-fold; it was \$676.00. In the late fall of 1914 we had the last heavy month, that is, \$662.00, and then it began to fall off a little. That was due, though, to moving certain apparatus out to the fair. They are operating now, however, under the same rates as the other consumers.

The next is the City and County of San Francisco. That is purely a concession to the city and county, due to its position in the 1607 community, or whatever you want to call it. The amount of consumption is large in the aggregate. For instance, they have gone up to say half of the American Can Company and sometimes more. There is not quite the same basis there, because of the fact that the consumption is scattered. The city and county of San Francisco has always since my time and before that been given the benefit of whatever low rate there was, regardless of the conditions existing.

If you take the gross business of the City and County of San Francisco, you will find that it is the largest consumer of gas that the company has, but its business is made up of many hundreds of accounts. If you take any one point of consumption, you will find that it is not the largest consumer, but that the consumption of the American Can Company is about twice as high. The City and County of San Francisco has a contract with the company for gas for street lighting, and the amount of gas sold under that contract is shown on page 2 of this exhibit. The rate averages about 60¢ per 1,000 cubic feet.

On page 11 is shown the rate given to the Hoover Spring Company which was the same rate that was given to the coffee roasters. That is an industrial enterprise. Our attention was drawn to them due to the fact that we had a number of automobiles ourselves, and we were buying springs, and we came in contract with the Hoover 1608 people and found out that their method of treating their steel springs was by the direct impinging of the flame upon the steel of the spring itself. The thought occurred to our engineers that that was an ideal case for gas installation, because in this process they would have not only the advantage of closeness of regulation, but they would have that coupled with the fact that you have a splendid opportunity to keep uniform heat, and not only uniform heat, but to get away from any excessive heats, or heat in

spots that would tend to get one point of the spring a little bit more highly tempered than another, the temperature would not be the same through the spring, and it would tend to crack at some point. So we built furnaces ourselves and we experimented with the Hoover Spring Company and finally, by giving them the same scale we used for other industrials, we succeeded in getting their business. But that is a case where it is not the price. I don't think you can find a case, hardly, where we can hope to get it on price; in other words, the competition is too keen, that is, they can take oil and do it for less money. But it is that ability for nice regulation and the freedom of any foreign matters in the gas that enables us to get a certain high class heat. I think now practically all of the automobile spring concerns are on our books and are regulated by the industrial rate.

The Hoover Spring Company is on our books under the block schedule rate for 1915-16. We still have the Hoover Spring 1609 Company and many others that we have since developed.

We now have seven installations used exclusively for tempering springs. The way we obtain these consumers is to take a man in one of the most up-to-date factories who seems intelligent and by going over his books with him show him what his actual costs will be. This work involves a great deal of bookkeeping. Very often you find in these smaller industrial shops that they do not really know what the different operating costs are. When you go into some of these larger concerns, however, you will have an opportunity to do business, because they have intelligent records. To illustrate what I mean, in order to get the business of a big kitchen, like the Palace Hotel, which is a very interesting example of gas installation, you have to dig up the cost of their oven tops, the repairs to their fuel pipe lines, the costs for the steam that is used to vaporize the oil, the amount of saving they will make in the fuel, or whatever they use to bring the oil up to the temperature it must have before it is introduced. We have to search pretty carefully to get all of those points to charge up to the other fellow in trying to 1610 point out that we are not so high as it looks at first blush.

Of course, after you get the gas introduced, you can then point with pride to the cool kitchen, and to the fine ventilation, and so on. The cooks in the Palace Hotel were obliged to change their underwear three times a day in operating under oil fires; now they change just once; they are quite a contented bunch.

I tried the St. Francis Hotel; I worked on it for a long time. I also worked on the Stewart. I was never able to break into that size business with gas for fuel. There are several reasons for that; In the first place, going back some years, oil was very cheap; there still exist to my knowledge places like the Union League Club, where they have a 65¢-a-barrel oil rate; the Stewart Hotel is either 65¢ or 70¢. There are a great many of these low-priced oil contracts still in existence. Prior to oil, the chefs were all educated to a coal range, a so-called French range. It is on an entirely different principle from the old gas ranges, in that the French range was a surface more or less uniformly heated; the cook would slap his

dishes down anywhere he pleased on it. The ordinary domestic range has its heat concentrated at certain individual points or burners and, in cooking, the process in the household is simply to place the utensil over these particular points. But in a big kitchen such as is used in restaurants and hotels they cannot do that; they

1611 need all their surface more or less uniformly heated; they will not even bother to take the covers off. If you look at an oil-fired range, you will see it is absolutely about a cherry-red heat all over the top. That is one of the advantages you have with gas, you do not get that condition; also you do not get the repairs incident to maintaining such high heat on these furnace tops. The oil people, who perhaps are our strongest competitor in that field, have spent a great deal of time with the chefs and the cooks and they got them educated to use oil instead of coal. If we had been successful in getting them to use gas instead of coal, we would have eliminated just one whole chapter out of our troubles. The oil men had educated these fellows into using oil, and we had to get that out of their systems and get them started on something entirely different. It was a very hard job. We did get a very small kitchenette affair in the Maux Hotel as one of the first ones. That was really the case of a restaurant that did not cater largely to short-order business, so-called; at the same time they wanted it possible to supply food at other times than the regular meal times. There we had the opportunity to do business, because we could save them the maintenance of heat over long periods when there was practically no business. So we did get a very nice little kitchen in the Maux Hotel for a start. It was a very, very small one.

We negotiated at the Palace Hotel for several years; at one time I thought I had Colonel Kirkpatrick educated up to the point where he would let us introduce gas, but I did not succeed. Finally, 1612 when Bishop and Caruthers came in there, we took the matter up again. We used the argument that the whole working condition of their force would be better if they could get gas in the kitchen. I do not know whether you have been in any of those big kitchens, but it is a terrible place over the peak load, say from 11 o'clock until two or a little after. These oil burners, with the high pressure air or steam that is used to vaporize the oil, make a terrible noise. Then you have the radiation from these stoves or ranges and you can imagine what that is. At the Palace Hotel each string is probably 40 feet long; that would be 80 feet of continuous red-hot surface that these cooks have to work alongside. They have a table right at their back, on the other side of the range, to do any seasoning or stirring; these ranges are so hot that they will grab up a kettle and turn around to their operating table and pour a little water into a dish, then put the kettle back onto the stove again, and then take up their apron and wipe the perspiration from their face and then take another crack at it. I talked to Caruthers almost entirely. Bishop was the hard, wicked partner that did all the figuring. He had figures upon figures; he had the same kind of curves that engineers draw. Bishop will tell you how many meals he cooks, how much it costs per capita and per meal,

and everything else you could think of. I tried to land him on
pleas that he would get a very much better working condition for
his help and everything would be clean and cool; farther
1613 than that, that his stoves were wearing out and, if he would
throw them out and put in gas, that then the conditions in
his kitchen would be so much better that he could get a very much
increased production. I forget his exact figures, but the number of
meals that are served at the Palace Hotel at lunch would astound
you. With oil-burning apparatus, there is a tendency to a very
greasy soot that gets over everything in the kitchen, the furniture,
the pans, and everything else. We finally got Mr. Caruthers, who
looks after that end of the business, satisfied, and that he would like
to try it, anyway. We worked on the chef; we got him interested.
I think they have 55 cooks at the Palace. It is quite an institution.
Of course, they come on in different shifts. Then I had to do business
with Mr. Bishop. As I say, he had on his table a lot of figures
and a lot of curves showing the cost of everything. He said that
his plant was nothing but a manufacturing plant. He could tell
you how much it cost to bring a potato to a certain point that was
necessary to sell it to a customer; that was the selling cost; also to
get the potato ready up to another certain point which he said was
the cost of manufacturing; he had the whole thing tabulated up and
down, over and across. We then tried to figure that if he counted
in his loss of tops on his ranges, if he counted in a reasonable depreciation
for his range, and interest, and the steam, that he
had to generate to vaporize the oil, and pumps for com-
1614 pressed air, and the heat that he had to put into the oil
before he could vaporize it—well, we got to a point where
there was a difference of perhaps \$50.00 or \$60.00 a month between
us. Then we stalled. He wanted us to meet that. I told him that
absolutely he had to do business on our schedule, that he could
have the same schedule that everybody else had. We fought over
it for quite a long time. Finally, he reached a point where he had
to make up his mind, because his ovens were about to burn out. He
finally agreed that, if I would guarantee to take these gas stoves out
and put in new oil stoves and allow him the junk value of the old
oil stoves, if the new installation was not satisfactory, he would have
the gas ranges installed. I told him that I did not care how many
conditions he put on, because if he once got the gas installation in
he would keep it. At first they wanted to throw it out right away,
because their bill was so high. That was due to the fact that the
cooks were not used to it; they were used to the careless way of
burning oil and keeping their stoves red hot all the time.
They did not realize that they must turn the gas off when
1615 they were not cooking. So I put a man down there in the
kitchen myself, and I kept him there following up right behind
the cooks and turning off the gas at any time it was not cooking
something. There were many ways in which they saved; less ice
for refrigeration; less power for the motors for ventilating. There
were many matters of that kind that caused a saving. They are
much pleased with the installation. The struggle, though, was very

hard. The negotiations ran away back to during Colonel Kirkpatrick's time. We had to make a quick installation for them; they could not stop doing business for a minute. We had to get a great crew of men in there. At a certain time when it was approaching their minimum load, we took out every oil range on one side of this room, about 40 feet, and displaced that with a gas range. The next night we pulled the other side out. We had a hard struggle to get what the traffic would bear. Their first bills were nearly double what their oil bills were, but by having this man on the job we gradually cut these bills down.

The consumer, S. Otake, shown on page 11 of this exhibit, is in the same class as the other Japanese, Nozawa.

The consumers, Albert Emhoff and E. Neugebauer also shown on page 11, were given the same schedule. The first one, on Geneva street, is a case of the application of gas to a creamery; the service, in so far as the method of utilization is concerned, is very similar to that of the laundry. Of course, the value of his product and 1616 the competition in that particular case is quite different. We succeeded in getting two industrials out in that same territory. This man who runs the creamery was one. Perhaps the more interesting one is the one you referred to, Neugebauer, 807 Mt. Vernon Street. That is the case of selling gas for a brooder, the man being engaged in raising small chickens. We experimented out there and were successful in operating this brooder by means of gas. I think perhaps you have seen an illustration of that; it is very novel. Of course, the extension of that application in San Francisco is extremely novel, because we are not a very great chicken-raising center inside the city limits; it did have the advantage of extending the use in Petaluma, however. It is extremely interesting to take those things up. Take a case of that kind, you there get some opportunity, because the man avoids the continual filling of a coal-oil lamp, which was his method. The little rows of brooders all had lamps in them, with little flannel pajamas on them, or whatever you want to call them. It necessitated taking the lamps out and refilling them. He counted his labor as being worth something. We were able, by a very slight reduction of the rate, to get his business. I do not think there are any other chicken raisers in San Francisco. The chicken industry is not very extensive here.

After we made the installation for Albert Emhoff, who had a creamery business, we were able to get other creameries. We had quite a number of installations; but I am not sure of the number. 1617 They used the Kane boilers in the creameries.

We have now covered all these special rate consumers from the fiscal year beginning July 1, 1912, down to June 30, 1915, with the possible exception of the City and County of San Francisco. Of course, the City and County of San Francisco is very diversified. They have a great many uses. Some of those uses, such as the schools and things of that kind, are the ordinary normal use; but we have developed new uses in the City and County of San Francisco for gas to quite a large extent. In developing those uses we are subject to just as keen competition as we are with any other industry.

With reference to those special uses, I recall one of the first cases, the fire houses in San Francisco; they had a system by which they maintained a boiler in the cellar, and then by means of steam from that boiler they got hot water for domestic purposes, for washing and all that, and in addition kept steam up to a certain extent in the fire engines themselves. That is quite necessary, because if they go out to a fire and the fire is nearby, they already have their engine practically under steam; then by lighting the little fires which are already kindled, they keep up the process. We succeeded in introducing gas by means of a coupling which is right on the floor of the fire house, and keeps the necessary fire going in the boiler of the engine. When the alarm comes and they start away with the 1618 engine, then, automatically, the coupling is pulled right out; there is no operation for the men in charge of the station to perform at all. The very act of the engine pulling out of the house disconnects the couplings and shuts off the gas. They found that extremely successful. With that, we developed the use of the ordinary Ruud heater, or Pittsburg heater, or that type of heater for their hot water, because when they took away the boiler from the basement they had to substitute something for getting hot water. Every firehouse in San Francisco, numbering at least 34, is equipped with gas for taking care of steam in the fire engine proper and taking care of the hot water for the comfort of the firemen in the house. That built up quite a business. Our main problem there was to compete with the various coal fuels which they formerly used, and also to get something that could be uncoupled automatically without impeding the progress of the engine in getting out.

I recall another instance where competition was very keen, particularly in keeping the installation in after we got it in, the fact that it cost a little more per month. We succeeded in replacing the old ranges in the county jail; although it is something of a struggle, we still have them in.

The same way with the new city prison, just east of the Hall of Justice. There they attempted to convert their existing coal ranges into using gas in place of coal; the disadvantage of that system is that it is, after all, in the nature of a make-shift, and does not 1619 have the advantage of the more efficient use of gas in the latest type of ranges. In order to save that business, we finally had to persuade them to put in a real gas range; since that time we have been able to get along all right.

We have a few systems of gas heating in the public schools; some, I believe, are Rector type, and some are the non-automatic type, such as the Hawks.

The business of the City and County of San Francisco, so far as it relates to the lighting of the streets and the furnishing of metered gas for public buildings, is a matter of public advertisement of proposals, and the submission of bids every year. We enter into a new contract each year. It is not altogether a formality. At about the same time that the bids go in for the lighting of streets and the public buildings and the use of gas, the city invites bids for coal and wood and fuel oil, and also for electric lighting as well. We have quite keen competition as between gas and oil in the question of

fuel. For instance, we ran a main to the Almshouse, and are prepared to supply gas at the Almshouse, and we have done everything we can to try to get it introduced, but up to the present time we have been unable to do so because we could not convince the superintendant that we could save him any money. It is only quite recently that he has agreed to take the matter up again. We are going to try to get him down to see the Palace Hotel kitchen as an illustration. But that is a case where we ran our gas mains and put in our bids and did everything we could, but we were beaten out by fuel oil.

The competition between electric lighting and gas lighting for the public streets is quite keen. There seems to be a decided tendency on the part of people to prefer electricity for street lighting. I do not think that is based upon any particular scientific measurement of the foot candles in the case of electricity versus gas, but just the feeling of the general public that electricity is more modern and therefore it ought to be better. So, we have changed a great many districts that were formerly lighted with gas to electricity.

We have competition of electricity with electricity; they will have a certain type of electrolier for a certain number of years, and then it gets out of fashion and they get somebody else to design something new, as they did in the case of Market Street; then you have a difference of opinion in different administrations; for instance, I recall Polk Street. Polk Street was lighted with gas before the fire. Right after the fire, at the instigation of the merchants on Polk Street, it was all rehabilitated, and we had these double Welsbach mantles with triple-top lamps; then some other people got interested in Polk Street and they ordered them all out and put in arc lamps, as they had before, one on each corner; then somebody else came along and did not like that and they used smaller units and more of them, putting them in between. So we have not only
1621 competition between gas and electricity, but between electricity and electricity, and then as between gas, because we now have the more advanced system of lighting, with the double inverted burner as against the old upright mantle, as illustrated on Fell Street between Baker and Stanyan. That is a newer form of inverted burner.

Throughout this entire period from July 1, 1912, on, there have never been less than three competing companies engaged in furnishing electricity for lighting in all the downtown part of San Francisco; at one time there were four, the City Electric Company, the Municipal Company (afterwards changed to Universal Gas & Electric Company), the United Light & Power Company and the Pacific Gas & Electric Company. These other companies competed very strongly in the bidding for public lighting by electricity and secured a portion of the business during some of the time covered by this report. So the Pacific Gas and Electric Company is not only, in its gas business, competing with its electric business, but in its electric business it is competing with other companies in the electric business.

With the possible exception of the City and County of San Francisco, the company charged all these special rate consumers that we have considered during these years beginning with 1912 and ending with June 30, 1915, a little more than the traffic would bear 1622 on the pure theory of the relative cost of the two commodities, obtaining the differential between gas and oil or wood or coal by arguments as to the cleanliness, convenience and efficiency of application of the gas. I do not know of any business today where the gas actually works out cheaper than oil. It is a question of convenience and so on added.

I worked for approximately two years on the block schedule of rates that was finally adopted in 1915-16. That schedule is from 85 to 55 cents per thousand cubic feet. It is so arranged that 50,000 feet of gas used gives us exactly 75 cents on the average. In other words, if you use 50,000 feet of gas and you were to divide the gross amount of your bill in dollars and cents by the gas used, you would arrive at exactly 75 cents as the average. That is because the 16,500 feet is at 85, and then twice that, or 33,500 feet is at 70, which consequently brings the average to 75 cents. The principle that I worked on in preparing this schedule was this: I considered that the man who uses a very small amount of gas should pay sufficient money to cover the so-called consumer's charges, that is, the cost of doing business. If you attempt to fix your rates upon 1623 the theory of cost of service plus a profit, then the cost of doing business is perhaps divided quickly into two parts, one is a fixed charge quite independent of what the consumer may actually use, and the other is a running charge which depends entirely upon how much of the commodity he takes. To illustrate, after you place a consumer on your books you have to go and read his meter every month whether he uses anything or not. It does not cost any more if he uses a couple of million feet of gas than if he only uses 2,000 feet. And the same way with a number of other charges in reference to the account such as the bookkeeping, the collection of the bill and so forth. The consumer should pay a sufficient price per thousand to take care of all these fixed charges under ordinary uses and still leave a margin of profit. When you get back your return you can begin to do business for a very much less net cost, because you have taken care in your earlier stages of the fixed charges. Of course if you followed out that theory, the top rate would not be 85 cents but something much in excess. In preparing this schedule, however, I was limited by the fact that the public utility act provided that we could not increase the maximum charge that we were then charging. So that we had a maximum 1624 rate fixed by the public utilities act and also a prohibition in that act against discrimination in rates. In theory I would have much preferred, instead of having the 16,500 feet at 85 cents to have gone higher and shortened the size of the block. We have between 20,000 and 25,000 consumers in the San Francisco District who do not use 1,000 feet of gas on the average per month. So you would not get from those consumers anything like a return at 85

cents. As we were limited, however, we made the size of that block sufficient to get a reasonable amount of consumption and kept it at the 85 cent rate. I drew curves showing exactly what was paid in cents per thousand cubic feet under every rate that we had. After I had kept on imposing these curves, I proceeded to try to work out a curve which just missed every one of them. I wanted to find a rate that could be used for the entire business of the company, and at the same time I had to do it without raising anybody's rate and without lifting the top rate; and in addition to all that I had to find a rate that would furnish some return to the company. It was quite a difficult matter and was more or less a matter of hit-and-miss to

find out exactly what rate would do. What I mean by "hit
1625 and miss" is this: If you take 100,000 feet of gas and charge 50 cents a thousand for it, you get a certain fixed revenue;

now, you will get exactly the same revenue if you take a series of stages that would average you 50 cents for 100,000, but you might have a whole lot of people in between who would vary under that block schedule, and you would, therefore, have to be careful of the steps that you took to get that average 50 cents. So what we did, after we had taken a rate that did not go higher than 85 cents and that plotted on these other rates that then existed and did not raise them, was to give the rate to the bookkeepers and have them apply it to the customers and report as to the return. Now some of the schedules that I tried would not do it as they took too much from the top of the scale. I tried to rectify that by bringing up the bottom, but I found that I could not do that because it brought the price of the gas so high that I could not compete. Finally, after two years, I arrived at this schedule which the company adopted and which, when put into effect, left us with two deviations, that I could not quite hit; one was the case of Mrs. Anderson and the
1626 other was a restaurant on Mason Street where we had endeavored to utilize gas for a steam boiler operating steam tables.

In working out this block schedule I had to do two things. It was not only a question of getting that last stage low enough so as to attract the industrial consumers, such as the American Can Company, but I had to keep the top from being higher than 85 cents. In making this rate for the industrial consumers I had to earn enough money at the 85 cent rate from them over and beyond what they might be theoretically entitled to pay in order to make up for what I would lose by giving the 85 cent rate to the little fellow, whom we were taking at a loss. The total gas sold to industrial consumers on the 1915-16 basis was 489,000,000 odd cubic feet, in 1914-15 it was 57,000,000 cubic feet, exclusive of the amount sold in each year to the City and County of San Francisco, or an increased consumption of almost ten times the amount. It is an interesting fact to note that the average rate in 1915-'6 was 68.87 cents while in 1912-13 it was a little under 62 cents. So you see that I have gotten almost 7 cents a thousand more average for the gas in spite of cutting the rate to build up this industrial business. It is also interesting to note that

the 480 odd consumers who used not less than 50,000 cubic feet of gas in 1915-16 did not get the slightest advantage over the ordinary householder until they have paid in dollars and cents approximately five times the amount of money that the average householder pays, then they get their first little break. They have to use twice as much more, or 10 times the average householder use, at 70 cents, before they begin to get the next break. Take the average revenue for 1912-13 of \$31.50 or \$2.617 per month. Before an industrial consumer breaks his 75 cent rate he has to use 50,000 cubic feet of gas per month, or he has to pay a bill of \$37.50 which is nearly 15 times the average bill. It is very often thought by the layman that these special industrial rates are straight, flat, low-rate propositions, but they are not; there is not a single consumer in San Francisco who does not pay for his first 16,500 cubic feet at 85 cents, except the city itself. When this schedule went into effect, the American Can Company had a contract rate of 60 cents per 1,000 cubic feet. I had to convince them that this scale was not going to raise their rate. They adopted it and I think it made a difference over a long term of about \$200.00 in favor of the consumer. All special contract rates have been eliminated now except in the case of the City and County of San Francisco.

There is a gas furnace, known as the Pacific furnace, which has come into use in San Francisco. For a long time the heating field

has appealed to us but the difficulty was that there were no devices on the market which prevented the products of combustion from coming into the house. We decided that we

must confine our activities to some form of a vented system in which the products of combustion were removed from the place occupied. The Rector system was such a system, and we spent a good deal of money in developing that system and introducing it into homes. We refer to that system, to the Hawks and Peerless systems and other similar systems as sections. When we refer to the size of a section we refer to the number of radiators put in. In 1913 we had on our system 632 sections. In 1916 we had increased the number to 2,052. The Rector system was an expensive system to install and required vents. In many of the older houses in San Francisco vents did not exist, and with the houses built so close together it was hard to get one in. In going through one of the newer districts we found that in most of the houses no provision had been made for heating. The houses had been built with hot-air vents, generally of the rectangular types, ending in the cellars, but the builders had found such a difference of opinion among their prospective buyers as to how

they wanted their homes heated, that no furnaces had been installed and the price thereof was deducted from the purchase prices of the homes. I thought that if I could find a furnace that could be put into those homes and utilize the system of hot-air radiation I would have quite a field of operation. I heard of a furnace in Los Angeles that was meeting with a good deal of success called the Pacific Furnace. That furnace does not depend upon the natural draft to get the hot air to the various locations as the air is taken there by means of a fan which revolves very slowly and makes

no vibration. The difficulty with any new device is that the people are so skeptical about it and it is pretty hard to get it installed. In some cases I had to guarantee their operation for four years. We have been operating and handling that furnace ourselves because no ordinary plumber or appliance man would go to the expense involved. The furnace costs about \$150 installed. Last year we put in about 80 of those furnaces.

We now have a new device called the Radiant Fire which is entirely different from any thing we have ever had. We must depend entirely upon the introduction of devices of the kinds mentioned and other devices in building up our industrial business, because
 1630 of the fact that the competition of electric lighting has absolutely eliminated gas as an illuminant. In addition to that we are eliminated from competing with electricity because of the fact that the newer houses and offices are not piped to use gas except for fuel. We also suffer from the fact that our competitors are making flat rates for the electric water heaters. We are constantly working to increase the consumption of gas in industrial and commercial enterprises, and at the present time are working on two ideas: one is the idea that we might be able to do something with the cooking of bread aside from the regular Dutch baking oven and the other is the idea of cutting metals by a gas torch. Metal workers have for some time been using the oxy-acetylene flame for cutting metal and it is remarkable what they can do with it. One of our men, Mr. Keppelmann, has just invented a combination blowing and cutting torch, in which gas is used instead of oxy-acetylene, by means of which he can cut through a 6" by 6" steel casting or forging at the rate of an inch a minute by simply burning it through with this long delicate looking flame, and the breadth of the cut in a case like that is not over an eighth of an inch.

1631 For public lighting, particularly street and display lighting, I would say that electricity became a competitor of gas in the very late '80's. In the early '90's the incandescent light became a large factor in commercial business, but there was very little residential electric lighting as late as 1897. That in itself would not have affected us so much, because at that time in the average residences you could not afford to burn an incandescent light at an efficiency much lower than about 4 watts per candle, in other words the life of a lamp depended upon the question of regulation. Where the fluctuations were very slight, you could use a much higher efficiency lamp than if you had considerable fluctuations, so it was determined that if you got any greater efficiency than 4 watts you sacrificed what you gained in current by shortening up the life of your lamp, so the common practice at that time was 3½ to 4 watts. In the downtown congested districts, where they had storage batteries and the most modern form of regulation, they got about 3.1 watts. That was advertised as a wonderful thing in 1905. In the meantime the Welsbach mantle had increased the efficiency of gas lighting. The first electric lamp to be developed to any extent was what is known as the Gem lamp with a metallized filament that was better than anything we had had. But the Tungsten lamp,

1632 which was developed next, was what crushed the gas industry for lighting. The Tungsten lamp increased the economy of electric lighting, but did not increase the light very much. The greatest development of the Tungsten lamp has been since 1914, but it first came into use about 1910. The Gem lamp came into use about 1906. In 1909 and 1910 we began to feel the competition with the electric light most and we began to see the slipping away of our gas business as an illuminant. In 1912 we organized the industrial department in which we put various engineers to try to work out all of these problems of use. The greatest difficulty, however, is not the technical end, but the business of convincing the owner of the industry that he can afford it. They all look at the top of the block.

The fact that changing from one form of appliance to another involves some capital investment also enters into the problem. In many cases we make the capital investment ourselves and let the owner pay it back in installments. It is simply another instance of the principle of obsolescence as applied to these various uses.

1633 Mr. Bosley:

Q. Now, Mr. Holberton, what has been your experience in dealing with consumers who used the plaintiff's gas in San Francisco with respect to their satisfaction or dissatisfaction with the rates established in the block rate schedule which has been in force since July, 1915?

Mr. Searls: I object to that as hearsay. I do not think that the statements of such consumers as Mr. Holberton has come in contact with should be taken as evidence against all the consumers in the city.

Master: I think I will take the evidence.

Mr. Holberton:

A. I am proud of the fact that, under that block schedule, we have not had any complaints at all. Of course, in the winter months we naturally get some complaints of high bills. People come into the office and ask, "Why is my bill this month higher than last year?" But, take it by and large, not only under this scale of 1915-16, but under our rates of the last three or four years, I have been in touch with a great many of our consumers and in addition have never missed the rate hearings before the board of supervisors, and we have had no general complaint as to the rates. I recall the first rate hearing that was held before the board of supervisors in the new city hall at 8th and Market Streets. At that hearing there was only one complaint on the gas rate and that was from a woman whom I knew. The incident was amusing to me because I
 1634 knew that, although the woman was perfectly honest in her purpose, it just happened that she had as a boarder a doctor who was one of my personal friends and who had frequently told me how late he sat up reading and how he enjoyed his gas grate. Con-

sequently, when this woman complained, I did not attempt to contradict her but explained the circumstances afterwards. The whole trouble with her bill was that she overlooked the fact that her boarder, Dr. Boyd, had come to board with her in that year. He had not boarded with her the other year. When I recalled his statements about sitting up late at night and enjoying the gas grate, I knew what the trouble was. We have never had any general complaint as to our gas rates.

Mr. Searls:

Q. There was one general complaint filed against you by the city government before the Railroad Commission, wasn't there?

A. Yes; and at the same time the city government filed a complaint with the Railroad Commission against the plaintiff's rates for electricity although those rates had been established by the board of supervisors in June. Both complaints were filed in August, 1915. The gas rates which were in effect at that time were those which had been established by the company after it had procured an injunction restraining the enforcement of the ordinance fixing rates for that year. I do not think that the action of the San Francisco city government in filing those complaints with the Railroad Commission was based upon any general complaint from the gas consumers. The purpose of filing the complaint was to obtain a rate as low as possible which I think was perfectly proper.

Mr. Searls:

Q. To the extent that the city government represents the consumers residing in this city, the complaint filed with the Railroad Commission was made in their behalf?

A. What I meant was that that proceeding before the Railroad Commission which was initiated by the city government was not instituted at the request of the gas consumers.

Mr. Searls:

Q. With due respect to your position, I do not suppose that you are in position to testify as to that. You do not know what kicks the city officials got.

A. I know a good deal of them because they generally send most of them down to me when there are any.

Mr. Bosley:

Q. Mr. Holberton, have you any further facts to present with respect to the reasonableness of the rates which the plaintiff actually charged for gas in San Francisco during the period involved in this litigation, to wit, from July 1, 1912, to June 30, 1915?

Mr. Searls: I object on the ground that the reasonableness of the rates which the plaintiff has sought to charge has no bearing on the

issues in this case. Evidence to the effect that the rates actually charged by the company are not unreasonably high has no bearing on the issues.

1636 Master: The objection is overruled.

Mr. Holberton:

A. Our efforts to bring about the use of gas for industrial purposes could not have been successful in competition with other available kinds of fuel nor could we have increased our gas business as we did if the rates actually charged had not been reasonable. I think the following facts tend to support the conclusion which I have just expressed:

Starting with five burners used in connection with China kilns for firing china in 1913, we had 25 in 1916; in 1913 we had 24 Johnson baking ovens, and in 1916 we had 71; in 1913 we had 29 portable bake ovens, and 102 in 1916; in brazing, welding, forging, and vulcanizing industries we had 123 installations in 1913 and 532 in 1916, and so on down the line. We could not have made these increases if our rates had not been reasonable. Now the rates have not only got to be reasonable as a whole; but each rate has to be reasonable in its application to the particular purpose for which the gas is used. One of the very desirable features of the block system is that the same rate applies for all of the varying industries, although, of course, the average unit price paid for gas used in brazing, welding, etc., is very different from the average price paid by the man who uses it in the delicate China kilns.

1637 I have not kept a record of the installations of gas ranges, etc., in the kitchens of the ordinary houses or residences, and therefore I cannot tell you what the increase has been in the case of such installations. But the number of installations of gas burning apparatus in restaurants, grills, cafeterias and similar places has increased from 178 in 1913 to 977 in 1916. The number of gas installations in laundries for purposes other than heating of boilers has increased from about 70 in 1913 to 249 in 1916, and at the same time there was an increase in the number of gas heated boilers from 15 to 69. The number of installations of gas burning apparatus for heating water for industrial uses, such as boiling meats and food products generally, increased during the same period from 48 to 255. The number of gas burning furnaces used for the manufacture of candy, pastries and other delicacies increased from 9 in 1913 to 53 in 1916. The number of furnaces used by chocolate dippers increased from 19 in 1913 to 61 in 1916 and the number of furnaces used in cooking doughnuts increased from 8 in 1913 to 52 in 1916.

1638 Cross-examination:

The first gas making apparatus installed in San Francisco was for street lighting purposes exclusively. That came about from the fact that one of the early founders of the gas company had received

a contract to light the streets of the city. The company was incorporated in 1852 and began lighting the streets in 1854. I think there were approximately 35 street lamps at the beginning. There was no private business at that time.

Outside of a few limited uses, the bulk of the development of the industrial and commercial gas business has been since the fire in 1906. We began to develop it intensively in 1907 and 1908. The larger part of the company's present distribution system and distribution plants was not in existence in 1907 and 1908. The North Beach plant was destroyed in 1906 as well as the plant of the Pacific Gas Improvement Company, and our present gas-making methods had not come into vogue. The company made big additions to its distribution system in 1911, and the Metropolitan Plant was acquired in the same year. Prior to 1907, distribution mains extended through the Western Addition about as far north as Union or Filbert Streets over to where Hyde Street comes into Bay 1639 Street and from thence to Columbus Avenue to about one block north of Pacific Street and thence to the bay; also south of Market Street as far as the channel. There was one main that went over to approximately Seventh, Eighth or Ninth Street and there was some supply near the Potrero and in Butchertown. The Mission district was pretty well piped over to Harrison and 25th and Valencia, and in the gore of Mission and Valencia. There was no gas supply at that time in Visitacion Valley, the Reese Tract, or other tracts to the southeast or the territory lying toward Ingleside. The Sunset district was not built up at that time and here was no distribution system there. There was a little triangular section over toward the Affiliated Colleges. In 1905 there were 67,177 consumers in the territory which I have just described. The fact that the company had these consumers was responsible for the system as it existed at that time. The construction of a plant is made to meet the demand for its service; as the demand grows you build your plant to meet it. I do not think that it would be true at all to say that in 1905 or 1907 our plant was built for the condition that exists today, or vice versa. So much of the plant as was installed at that time was primarily due to the requirements of the residential consumers, the street lighting and some commercial consumers. The use of gas for residential lighting purposes commenced to diminish in 1908 and very seriously in 1912 and 1914. There is almost no opportunity for competition now. At that time the company was confronted with a situation where it had a very large investment originally made to serve the residential consumers and for street lighting purposes and such downtown business as they had then and were in danger of losing that investment unless they developed some other line of business. But we have always developed that business fast enough so that the investment has been obliged to grow. It was also a case where the top price permitted to be charged for gas during that period in question was going down. In order to stand that without suffering entire loss of return on the investment, you must go ahead and build large volumes of business at more profitable rates.

The company lowered the top prices for gas, but it was not always voluntary. The practice of most companies is to figure that a small reasonable reduction in price of a commodity is good policy.

After a rate is lowered we can generally figure that it requires about four years to bring the revenue from the existing consumers back to normal. Most companies would be glad to suffer that economy for a little while, and after all, if its commodity is made slightly more reasonable, its use is increased so long as you have not reached saturation. When you do reach saturation, you gain nothing by it.

Q. At any rate, when you started out to develop commercial and industrial business, you did so at such rates as you could get, rather than at such rates as an estimate of the cost of the business might dictate? You charged all that the traffic would bear, but that did not have so much relation to the cost of the business as it did to the value of the service to these customers?

A. In our case, we always have both sides before us. We could only get what the traffic would bear, in developing new business. You get as much as the consumer is willing to pay, and no more. But you might find plenty of gas business if you took it on what-the-traffic-would-bear theory, but you could not do it if it becomes so low that it does not meet your theory of cost-plus-profit. All of the industrial business that we have been building up has not only been built on one side by what the traffic will bear, which makes the maximum we can possibly get out of it, but on the other side it is limited by the fact that we cannot take business when it comes so low as to make it unprofitable. In that case there would be no object in increasing the business. You have to figure what is the

lowest rate you can charge that will still be profitable. When you figure such a rate you cannot figure merely generating and distribution cost to that particular customer, but you must figure on the whole investment. When I figured the rate to the American Can Company, whose plant was near one of our gas-holders, I considered that there was practically no distribution cost there, but I also took into consideration that the same rate would be applicable to any other consumer of the same class in San Francisco. The consumers of that class are grouped in districts which are more or less conveniently situated with respect to our generating plants; but that is because the generating plants and distribution system were built to meet the growth of the city. That is the very reason why it was so advantageous to acquire certain competitive systems; the heavy trunks of those systems were naturally situated in the heavier districts, as they always went into the cream of the business. The Metropolitan Company, for instance, only extended its mains in a certain limited territory, and its distribution mains were always large at the source and tapered off small, the same as our own distribution mains from our stations. By combining the two systems we saved an immense amount of money.

In making a schedule of rates applicable to those consumers who use gas in large quantities, we did not ignore the company's invest-

ment in its general distribution system or the cost of distributing gas to the individual residence consumers in the outside districts. An industrial consumer gets no reduction of rates until he has paid five times as much in gross dollars as a residence consumer; his due proportion of the return on investment, depreciation charges and other general charges is included in the higher blocks of the schedule. If we were to figure a flat rate, a certain amount to begin with, there might be some opportunity to say that we have deducted from that rate the amount of certain depreciation costs, overhead costs, casualty and franchise costs and the like, but we have not. In figuring this man's rate we first let him pay everything that anybody beyond him has ever paid or expects to pay, and then we say that if we can get some more dollars after these are taken care of, it will certainly help the whole situation. It depends on the amount of gas that he buys, but that amount is regulated in blocks. We do not say to the consumer that "If you will take 100,000 feet of gas, your rate will be seventy cents; if you take 50,000 feet, it will be seventy-five cents." As a matter of fact, if he takes 50,000 feet of gas, his average rate is exactly seventy-five cents, but it is not charged that way. What we do say is, that if you are willing to pay us 85¢, the same as everyone else, for the first block of your gas, then we are willing to make a little concession if you will take an additional quantity under conditions that involve no increase of the cost of delivery.

1644 A railroad company charges the same rate per carload, whether you ship twenty carloads or one carload; but, if you ship less than a carload, there is a difference in the rate. It is the same with this company; so long as you take the same package, we make no difference.

Our block rate schedule does not involve the assumption that it costs no more to serve a big consumer than a little one; but it does involve the assumption that there are certain items or elements of cost which are no greater in the case of a big consumer than in the case of a little consumer. There are other elements of cost that are actually greater in the case of the big consumer than in the case of the small consumer, though they are less in proportion to the amount that he consumes. There are other items or elements of cost that are absolutely proportional to the quantity of gas delivered. I think perhaps you can illustrate that in electric rates, such, for instance, as the charge in the city of St. Louis and in one place in Canada, where they charge a man something after this fashion: They say, "Well, you pay us \$1.00 a month" (they call that a consumer charge); and then they say, "Now, you pay us 25¢ for each room in your house exclusive of closets and small halls, and then you pay 2¢ a kilowatt hour." The theory of that is, that the dollar

1645 charge takes care of those things that have to do with the number of consumers only, such as bookkeeping entries, collections, reading of meters, and so on. The charge that is based upon the number of rooms in a house is intended to cover that sort of a charge wherein the investment varies with the amount of consumption; in other words, they have a little bigger meter charge in

the large house than in the small house, and the service wires and appliances may be a little larger.

The two-cent-a-kilowatt-hour charge covers the amount of oil that is burned for generating power. The same thing holds true with the gas rate. There are some costs that are absolutely independent of the amount of gas that the consumer uses or the size of his installation. There are other costs that are dependent on the size of his installation and independent of the amount that he uses; and there are other costs that depend entirely on the amount he uses, such as the oil used for generating gas.

When I started to figure out what the cost of this public business was to the company, I could not make certain allocations of expenses between generation, distribution and consumers' expenses and so on, and then determine the proper charge per consumer for consumer expense and distribution expense in addition to the cost of generating gas; because when I attempted to do that, I arrived at the difficulty that the smaller consumer, for his earlier stages, ought to pay much more than 85¢; so I had to arbitrarily cut that off and
1646 add to the volume included in that curve enough to make it up.

Not all expense incurred in obtaining new business is included in operating expenses; some of it is.

It takes far more man-hours per cubic foot of gas sold or on any other basis to get residence consumers who use on the average only a little over \$2.50 worth of gas per month, than it does to get the larger consumers. It is not a fact that the residence consumers simply come into the company's office without solicitation and sign a contract when they want gas. As a matter of fact, we maintain in every district in San Francisco solicitors who operate in that district and sign up consumers for gas and electricity. We have solicitors who do nothing else but travel through poor districts trying to get the people to pipe their houses for gas; for in those districts many of the houses are not even piped. We go so far as to finance plumbers and get them to offer to run a service pipe to the house, if the owner will install a cooking stove. The number of solicitors engaged in the ordinary residential districts far exceeds the solicitors among industrial men.

In 1915-16, the gross revenue from the industrial consumers was more than \$337,000.00, while the total gross revenue from all consumers was approximately \$4,000,000.00, or about ten to one. But you must remember that there is not ten times as much profit in the business obtained from the smaller consumers.

1647 There is no consumer of the company that enjoys a rate of 40 cents per thousand cubic feet. As I stated before, the American Can Company has a block schedule so that, with the payment of five times the average at 85 cents, and then twice that at 70 cents, and the intervening blocks, it could not possibly earn a 40-cent rate, no matter how much gas it used. The American Can Company originally occupied two places, one on Treat Avenue and one at 7th and Townsend Streets. Their average rate on the block sched-

ule which they enjoyed at that time was approximately 59.28¢ per 1,000 cubic feet of gas. The American Can Company at the present time occupies one large building at the Potrero with one set of meters. Their average rate at the present time on a basis of approximately 2,000,000 cubic feet of gas per month is .4675¢. In quoting the rate to the American Can Company, I took as a basis the cost price of gas in the holder, which is approximately 30¢ per thousand cubic feet, and I knew without any computation that if I could obtain a price at twice the cost in quantities such as the American Can Company used, it was good business. That rate included a margin for distribution cost.

The block rate used in 1915-16 was a rate to meet the actual conditions and was a hit-and-miss rate until, by various blocks, I found the rate which would give the return necessary without raising the top to the point where we would lose small customers, owing to the keen competition and the psychological effect on the consumer. If you raise your rate to the theoretical point, you will probably lose the business, whether it is actually cheaper to use coal or not. The lower rate of the block schedule was a question of what the traffic would bear, more than anything else. We never reached a point where we had to consider whether we would lose any money by so doing.

1648 Page 14 of said Exhibit 50 shows that the average rate per thousand cubic feet of gas sold to consumers in the year 1915-16, who used not less than 50,000 cubic feet per month, was .6887 cents. In other words, they represent in round numbers approximately 10% of the gross dollars I was able to obtain from the conduct of the business contributed by one-half of 1% of my customers.

In determining the sufficiency of the rates charged to those who used gas in large quantities, I took into consideration the number of gross dollars I would obtain from those customers by applying those rates to their actual physical condition,—the actual bills that they had had for an average year or an average month. I knew this revenue covered the cost of the business, because I knew that the cost, exclusive of items that could not be saved by the loss of that business, was so much less than the amount received per unit that I did not have to think about it.

As long as I can get additional business at a price in excess of cost,—in excess of the amount which I could save if I did not have this business, then it is advantageous to take such business. If I can conduct my business on a larger scale, I can use larger apparatus that is more economical in operation, and, by operating that apparatus more uniformly, I can effect savings in the amount of oil and labor required for a unit quantity of gas produced. You may have a business in which you can show me a profit in percentage that is wonderful, but if you have not enough gross dollars to keep your business going, it does not help you very much.

1649 Whether a residence does or does not use gas is not so much a question of price as it is question of psychology. If we had a given rate in residential districts and we wanted to enlarge our

business, the question of whether we would think of lowering that rate to make it more attractive to such consumers with the hope of increasing the consumption would depend entirely upon what the rate was at that time and on the possibilities that might accrue from the reduction. You must remember that the gas business is of a long and steady growth; that the rate began at \$15 a thousand and that, partially by voluntary action and partially otherwise, it has been coming down. There is not any question but what the original reduction in that rate was because, in the minds of those who made it, it was thought that such reduction would increase their growth. In the early days we figured that a reasonable reduction in rate would probably be made up to the company in the course of from two to four years. When the rate was fixed at 75 cents in 1912 it was pretty clear to most of us that it would not work out. We tried it for one year as a matter of policy and not because we thought we were going to get a return.

1650 Mr. Searls:

Q. Did you not personally state to the board of supervisors and to the rate committee at a meeting held in June, 1914, when the board had under consideration the fixing of gas rates for the fiscal year beginning July 1, 1914, that you, on behalf of the Pacific Gas and Electric Company, would be willing to accept an 80¢ gas rate for that year and not seek to enjoin its enforcement in the Federal court if the board would grant that rate?

Mr. Bosley: I object to the question upon the ground that it calls for a statement of an offer of compromise, it appearing by the testimony already introduced that the rate established by ordinance for the year ending June 30, 1914, was 75¢ per 1,000 cubic feet and that a suit was then pending which had been brought in this court for the purpose of enjoining the enforcement of the last mentioned ordinance.

The Master: The objection is overruled.

Mr. Holberton:

A. In order to answer the question intelligibly I think it necessary to state the attendant circumstances. The board of supervisors met about two o'clock in the afternoon and the hearing upon the subject of the gas rate to be fixed for the ensuing year dragged along until late in the afternoon. At length certain members of the rate committee of the board of supervisors came to me and said, "Now here, you have been arguing and fighting for 85¢; we have been
1651 running right along on a 75¢ basis; now suppose we make it 80¢. If we can get by with that and the board passes an 80¢ rate, will you go to court about it?"

As a matter of policy, after consulting with the officers of the company, I replied, "No, we will not attempt to enjoin the rate if you fix it at 80¢." I offered to accept that rate as a matter of compromise, and, as a matter of policy, we determined that we would try it out.

Q. And then, as a matter of fact, wasn't there further discussion and didn't Mr. Britton, as vice-president and general manager of the company, offer to accept 79¢?

A. I think you may be right, but I am not sure. I know there were several offers back and forth.

Q. And did you not personally make the statement to the chairman of the gas rate committee prior to that meeting that you would accept an 80¢ rate if the board would adopt it?

A. Absolutely no.

1652 Redirect examination.

In the the early stages of the gas business nothing was known except a flat rate of so much per 1,100 cubic feet of gas. There were no discounts for kind of use or quantity used until we got to a point in 1861 where a reduction was made for very small amounts used, something like 3,000 cubic feet per month. A few years after that a 5% discount was given to consumers who used a 1,000 feet every night. In 1908 was practically the first attempt to put in a schedule rate or anything distinctly different from a fixed rate per 1,000 cubic feet. In the middle of June, 1906, there was a deadlock in the Board of Supervisors but the rate used was a dollar a thousand. From June to October, 1906, we had an 85¢ rate, but beginning in October the company gave a sliding scale based on quantity used. In 1912 and 1913 we reverted to a flat rate of 75¢ per 1,000 cubic feet which was made by the Board of Supervisors. We strongly objected to that rate but were finally overruled and tried it for a year. It would not give us the revenue that we felt we needed, so, in September, 1913, operating under the injunction, we adopted a scale rate from 85¢ to 75¢. Under that scale, if you used less than 20,000 cubic feet, you paid 85¢ a thousand flat. If you used more than 20,000 feet, you paid 82½¢ and so on down the scale. In the latter part of 1914 I began to work out the block scale. I continuously worked on that and had our book-
1653 keeper apply the different rates that I worked out to consumers in various sections of the city. In arriving at the block schedule ranging from 85 to 55¢, I was limited by certain conditions. I did not want to get beyond the 85¢ rate which we had voluntarily adopted ourselves. I understood that, to raise the top rate, would be in variance with the provisions of the Public Utilities Act.

Knowing that the gross dollars received by the company under the 75¢ rate was inadequate, I must ascertain whether the 85-55¢ schedule rate would bring that revenue up to what we ought to have. In arriving at that, I have to assume that, if you raise a rate (even if it is only a little bit), you naturally make people more economical. They do not know whether that raise means a raise to them at the rate of 5¢ a month or 10¢ a month; they feel the rate is raised and therefore must economize. It does not follow, however, that if you lower a rate they will argue that they must use more gas. As a matter of fact, what really happens is that the ordinary consumer

goes on in the even tenor of his way and smiles and says that he is going to save a little bit of money.

As soon as you can create a use for gas among the consumers that use gas for various purposes, you have an opportunity to make up for your loss of gross dollars under a lesser rate by a larger quantity of gas used. The people that use gas between 3,000 and 1654 50,000 cubic feet a month are largely business enterprises.

That is where we endeavored in this schedule rate to bring up the business. We were able to do something else in this rate and I was quite proud of it when it was actually worked out: In this uniform rate that is applied throughout the system, the average return to the company, from the man who gets gas for less than the rate formerly fixed by the Board of Supervisors, was very materially increased and still we were increasing the volume of business done with that class of people. I was not concerned in the details of just how much was the cost to the company of delivering the gas because I have had no case yet in which the average unit return is less than approximately 60¢, and the entire average over those who get less than 75¢ is almost 69¢.

Recross-examination :

The residential campaign that we have been conducting is not so much a campaign to increase the consumption of the individual consumer as it is to increase the number of consumers. We would like to have a meter in every house. We canvass the territory and we find a man that has not a water heater. We turn that man over to the water heater company and try to work that up. You do not have to reduce the rate of that consumer if you convince him of the convenience of using gas. In conducting this campaign in very large 1655 houses, we have to deal with the servants and sometimes with the man of the house. In the ordinary household, the largest amount of business is done with the woman of the house.

Q. And is the psychology of the woman of the house so different in the gas business that a bargain does not appeal to her in the use of gas as much as would any bargain she is able to make?

A. It is entirely different, the whole psychology is different. When a woman goes into a store to buy a dress, she asks the price of the dress; she doesn't want to know what the dress costs per pound, or per square inch of material in it, or the number of buttons, or anything else; she knows right away a certain definite fixed price. It is the same way with gas, they very rarely even ask you the rate for the gas. We had long ago questions coming up as to the amount of gas that people were using. They would say, "My bill seems a little high, I think your rate is too much." You ask them if they know the rate and they rarely can tell you. They don't know. They look at the gross bill. Now, if you are going to sell them a water heater, they will say, "How much is my bill going to be," and if you tell them 75 cents the thousand it will not mean anything to them; they would ask you, "How much will it cost me." You must not answer by saying, "It will cost you 75 cents a thousand, and if you use 10,000 cubic feet it will cost you 7.50." We would not get

anywhere with that kind of an answer at all. What we have
1656 to do is to tell her approximately what our experience shows
that houses of her type in the vicinity usually burn. We
can generally do business a little better if we happen to know the
bill of somebody right in the immediate neighborhood, so that we
can say to her, "Well, Mrs. Jones, who lives right across the street,
has one of these, and her bill is \$3.50." She will say, "Oh, is that
all it costs? I think I would like to have one put in." She never
will understand any other method.

Q. If you tell her she can increase the consumption of gas by
putting in the gas heater and that you are going to reduce the rate,
and that probably her gas bill will not be any more than it has been
before, that would be something more of an inducement, would it not,
and you would get the same gross revenue you had before, and prob-
ably have a chance to increase it? There is always an overlap.

A. Mr. Searls, if I had to increase my business on the basis that
I would only arrive at the same revenue for twice the gas sold, I
would never get anywhere.

Q. I don't mean just the same, I mean to say that the increase
would not be proportional to the additional amount of gas used.

A. There is merit in your argument if I had only been permitted
to lift that top a little bit; I would have liked to, very much.
1657 In estimating the scale of rates, I had the various scales
applied by the bookkeeper to the amounts consumed by the
various consumers over a period of many years. This particular
block schedule was applied to the business of October, 1914, which
happened to be the last average month that we had passed. The
way we applied it was this: We took a ledger that contains the names
of the consumers and the amounts of gas that they used. In that
month of October they had actually been charged with gas on the
basis of the sliding scale from 85¢ to 75¢. Now, I said to the book-
keeper, "Suppose that, instead of charging these consumers 85¢ to
75¢, you charge them on the basis of this 85-55¢ block scale and give
me the amount of revenue which the company would obtain by multi-
plying that revenue for the month of October by twelve." Then I
knew what the annual return to the company was going to be under
this block schedule. The question of how much difference the con-
sumption will be to every consumer under the different rates is a
matter for me to decide. I must determine in my own mind whether
his consumption is going to increase or diminish. The reason for
selecting the month of October is that the amount of gas sold by the
plaintiff company in San Francisco in the month of October is usu-
ally approximately one twelfth of the total amount sold in the en-
tire year. That is why I refer to October as an average month. In
the same sense March is also an average month.

1658 HAROLD PERCY PITTS, a witness called on behalf of plain-
tiff, testified as follows:

My full name is Harold Percy Pitts, I am 45 years of age and a
resident of Oakland, California. I am an Industrial Engineer and
the head of the industrial department of the Pacific Gas and Electric

Company, in its San Francisco district. My duties are to sell the company's commodities, mainly by demonstrating their utility, and are almost entirely confined to demonstrating new uses for gas and electricity. That department has been in existence since July, 1912.

I have prepared a statement showing the result of my efforts in developing the use of gas for new purposes, beginning with the year 1912. This statement was prepared from the records in my department, with the exception of the last sheet which shows the gas consumption of certain classes of industries and which was prepared from records obtained from the bookkeeping department of the San Francisco District of the Pacific Gas and Electric Company of which Mr. Oldis is the head bookkeeper. I had in my office a card system showing the different consumers that used gas for industrial purposes. These cards I sent to Mr. Oldis who marked on them 1659 the amount of gas used by each such consumer during the month of December, 1912, 1913, 1914, 1915 and 1916. I took the month of December as I thought it was a fair month to show the average yearly consumption per month of gas and also to bring it up as nearly as possible to the end of the year. This statement is correct to the best of my knowledge and belief.

Mr. OLDIS, a witness called for Plaintiff, testified as follows:

I compiled from the consumers' registers of the Pacific Gas and Electric Company in its San Francisco district and caused to be entered under my direction the amounts of gas sold to the consumers who are listed on the cards testified to by Mr. Pitts. The amounts entered upon those cards show the quantity of gas consumed by those different consumers in the month of December, in the years 1912, 1913, 1914, 1915, and 1916 and are to the best of my knowledge and belief correct.

This statement was introduced in evidence and marked "Plaintiff" Exhibit No. 55 and is in substance as follows:

1660 During the year 1912 the Industrial Department of the San Francisco District, Pacific Gas and Electric Company, was established. Its duties, among other things, were to endeavor to create a greater demand for the company's products by demonstrating their utilities. First, it was necessary to go to the manufacturer and the merchant and to study their needs, method of production and equipment. Upon getting an insight into this, the next step was to ascertain whether or not gas could be used in their production. Upon determining that our commodities could be used followed the designing of burners, ovens, furnaces, appliances and other apparatus, together with the necessary experimental work and perfection in economics, principally to make a satisfied consumer and to meet competition of the other fuels viz: wood, coal and oil.

It was not very long before the prospective consumer began to appreciate that the efforts of the department were being exerted to his benefit, and its services were sought rather than forced upon him.

1661 The organization of the department involved a good deal of time and expense before results began to show, so that results as to a marked increase in gas consumption were not very apparent for the first year—that of 1912. At the end of the year 1913, the average monthly consumption of gas for appliances installed under our supervision had reached 8,000,000 cubic feet; at the end of the year 1914 the total average monthly consumption was 14,000,000 cubic feet; in 1915 the average monthly consumption was 23,000,000 cubic feet, and in 1916 the average monthly consumption reached a total of over 34,000,000 cubic feet.

The energies of the department were exerted toward the mechanical uses of gas in all its phases, including iron working establishments in all of their ramifications, all other types of manufacturing, viz.; wood paper, leather, textiles, etc. as well as the manufacture and preparation of foodstuffs, viz.: prepared foods, confectionery and kindred productions, such as bread, cake and pastry, candy, coffee roasting, etc.; hotel and restaurant kitchens, laundries, cleaning and dy-ing works; house, store and factory heating. This latter classification, however, received very little attention, it having been considered until recently as coming under the head of "domestic uses".

1662 The following is a tabulation which shows the increase in appliances during the years as enumerated. The year 1913 includes 1912 also.

	1913.	1914.	1915.	1916.
1663				
Art glass, china kilns and special burners.....	5	15	16	25
Bake oven burners:				
Johnson	24	38	69	71
Portable	29	62	82	102
Boilers	15	26	50	69
Can making apparatus.....	3	5	5	5
Candy furnaces.....	9	18	33	53
Cauldron burners.....	4	7	22	28
Chocolate dippers, batch warmers, etc.....	19	27	52	61
Coffee roasting burners.....	..	3	4	11
Doughnut furnaces.....	8	37	41	52
Enameling ovens.....	3	5	9	12
Fire engine burners.....	32	32	34	34
Brazing, welding, forging, melting, vulcanizing, etc.	123	261	363	532
Heating-sections units.....	632	1,262	1,950	2,052
Incubator burners.....	5	12	14	15
Kitchen equipment burners Griddles, Coffee urns, Hot plates, steam tables, etc.....	178	411	775	977
Ranges	82	154	249	326
Laundry equipment burners, mangles, irons, etc..	70	157	234	249
Newspaper equipment burners.....	5	6	7	8
Water heaters.....	48	118	199	255
Spring tempering burners.....	2	6	6	7

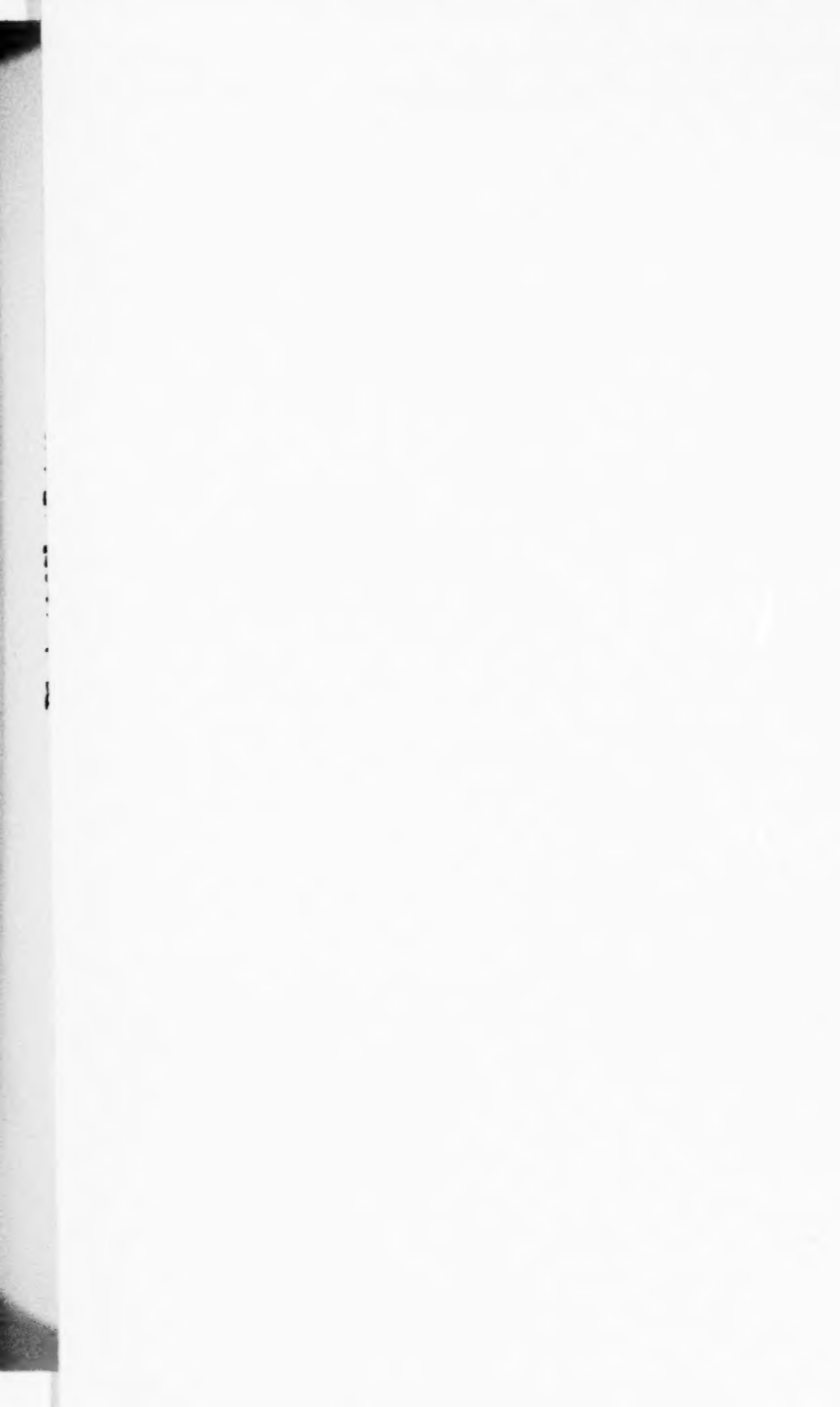
1664 A great quantity of these appliances have displaced wood, coal and oil as fuel, while the remainder have been installed in the face of these fuels as competition, as one or two examples will illustrate.

It was discovered that of numerous Dutch bake ovens of the smaller type located in San Francisco, nearly all of them were found to be using wood for fuel. The process was for the baker to spend his afternoons splitting up wood for his oven. This wood, in a great many cases, was bought at a very low figure, it being old lumber, ties, etc. The fire was kindled on the floor of the oven and allowed to burn to ashes. This process heated the brick floor to the desired temperature, when the ashes and dirt were removed, and the batch placed in the oven and baked. The engineers set out to design a burner for the use of gas that would accomplish this same result. Various experiments were made with different types of burners, with and without "blowers", and finally a satisfactory type was adopted. Then a campaign was started for their installation, with the result that fully seventy-five per cent of the small Dutch bake ovens have been equipped with this type of burner. This method of 1665 operation is followed in each individual classification of manufacturing prospects.

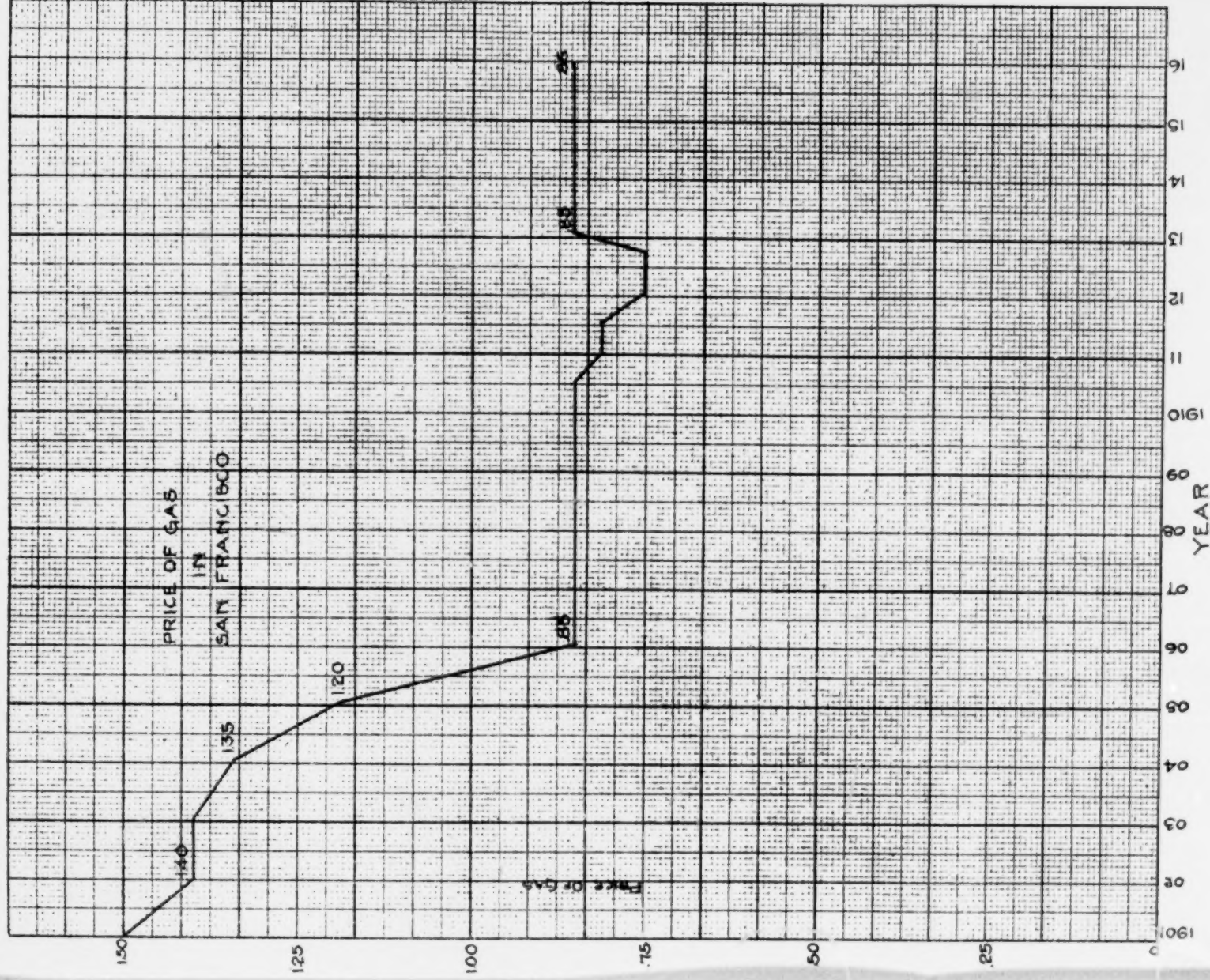
Among the developments that were achieved was the equipping of all of the steam fire engines in San Francisco with gas burners; heretofore, a cumbersome method had been used, the water in the boiler having been kept hot by means of a coal boiler located in the basement of each fire hall with pipes extended up to the engine above, and a hot water circulating system maintained between the two. A gas burner was designed which gave a gas flame in the fire-box of the engine immediately below the boiler; by this change a low pressure of steam was maintained in the boiler which made it much nearer ready for immediate use and more efficient.

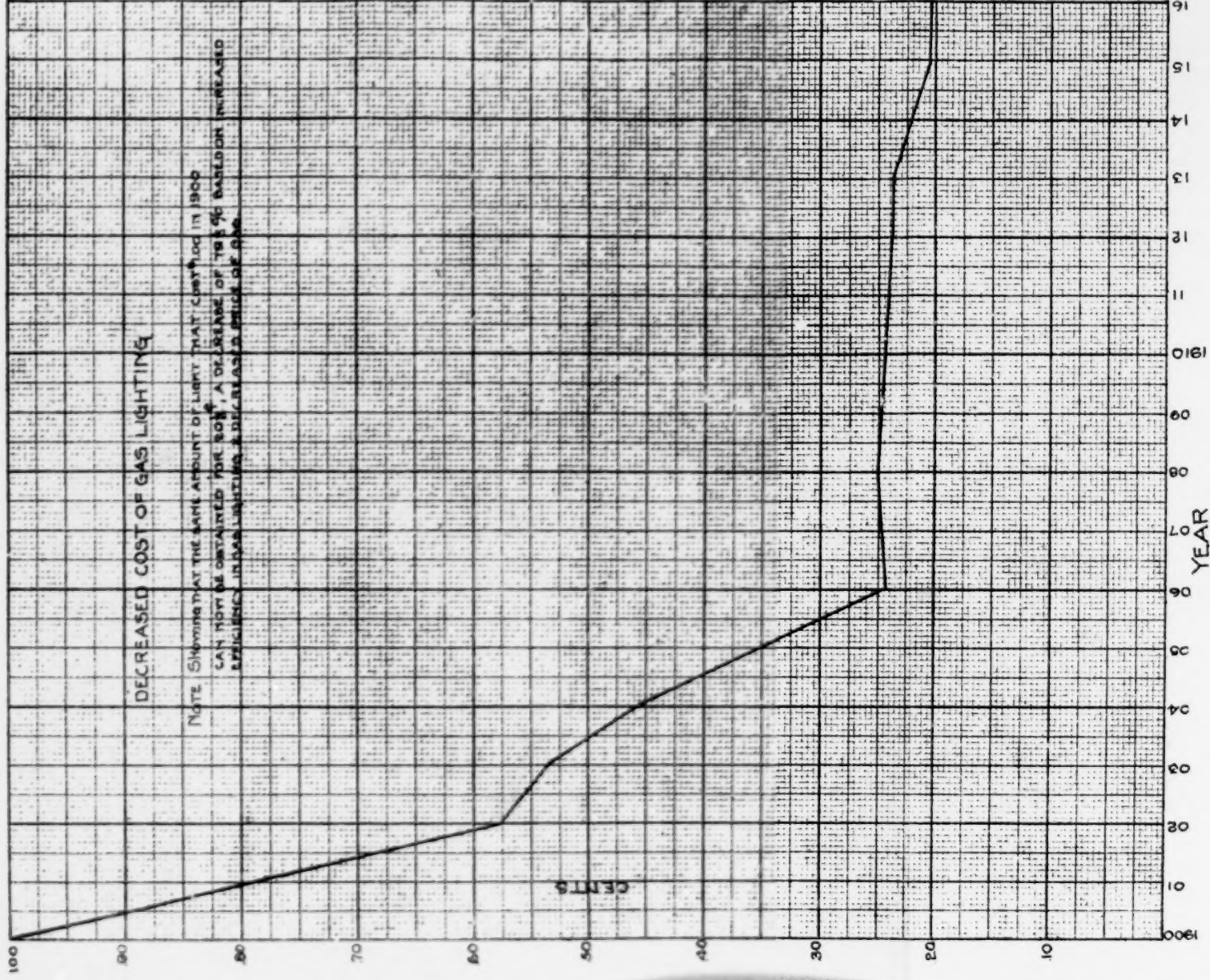
The following table copied from the last page of Exhibit No. 55 shows the quantities of gas used in various industries in San Francisco in the month of December for each of the years from 1912 to 1916 inclusive.

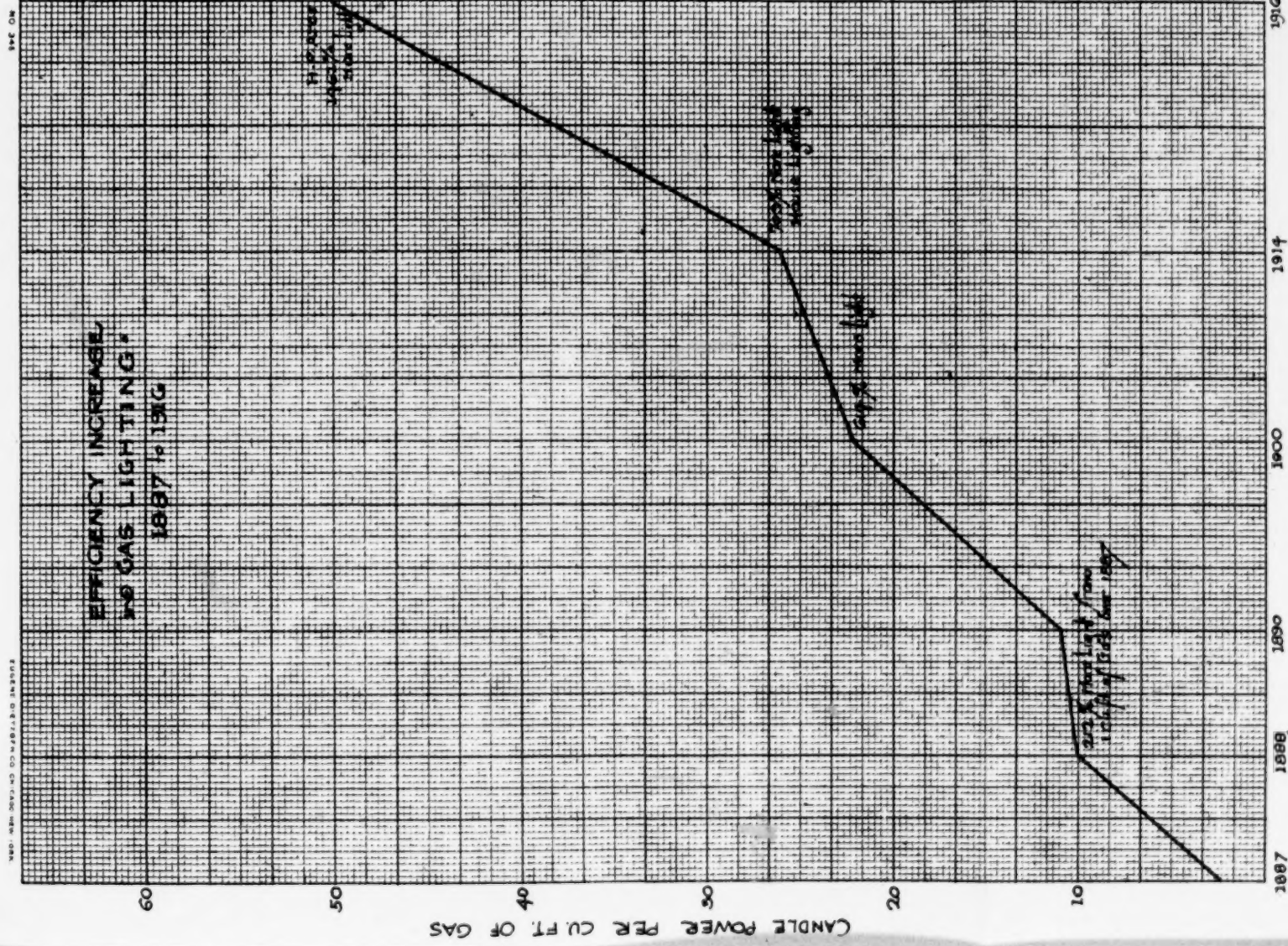
<i>Gas Consumption.</i>					
	Classification.	Cu. ft. December, 1912.	Cu. ft. December, 1913.	Cu. ft. December, 1914.	Cu. ft. December, 1915.
1666					Cu. ft. December, 1916.
	Laundries	2,773,600	3,525,300	3,846,500	4,805,800
	Bakeries	1,800,700	2,106,700	2,430,800	3,057,900
	Candy stores & factories.....	1,074,100	1,580,200	1,633,900	2,072,100
	Coffee roasting.....	1,487,100	1,749,600	1,767,800	1,993,400
	Markets, etc.....	144,000	268,400	328,200	512,600
	Saloons & cafes.....	1,160,300	1,240,200	1,405,400	1,628,100
	Dyeing, cleaning & tailoring.....	322,200	886,400	720,800	889,400
	Newspapers & printing.....	2,008,300	2,131,000	2,285,300	3,212,500
	Manufacturing	2,644,200	3,958,700	4,254,700	4,953,000
	Creameries	16,000	15,200	15,900	108,800
	Restaurants, hotels & institutions.....	13,029,100	17,839,900	20,801,700	26,519,900
	San Francisco Fire Dept.....	700,000	795,300	755,100	887,800
	Total	27,159,600	36,096,900	40,246,100	50,641,300
					59,334,500



GAS RATES IN CITIES OF UNITED STATES HAVING POPULATION OF 200,000 AND OVER.						
CITY	STATE	POPULATION	RATE PER M. CU. FT.			
			1913	1914	1915	1916
LOS ANGELES	CAL.	612,250	.75 -	.80-.70	.68 -	.68 - .645
OAKLAND	CAL.	320,520	.90 -	.90-.75	.90-.75	.90-.75
SAN FRANCISCO	CAL.	530,000	.75 -	.85-.75	.85-.75	.85-.55
DENVER	COL.	213,381	1.00-.85	.95-.80	.95-.80	.95-.80
WASHINGTON	D.C.	331,069	1.00-.85	1.00-.85	1.00-.85	1.00-.85
AURORA	ILL.	200,000	.95-.90	.95-.90	.95-.90	.95-.90
CHICAGO	ILL.	2,185,283	.80 -	.80 -	.80 -	.80 -
INDIANAPOLIS	IND.	250,000	.60-.40	.55-.40	.55-.40	.55-.40
NEW ORLEANS	L.A.	275,000	1.20-.75	1.10-.75	1.10-.85	1.10-.75
BALTIMORE	MD.	675,000	1.00-.80	.90-.80	.90-.80	.85-.75
BOSTON	MASS.	706,301	.80 -	.80 -	.80 -	.80 -
DETROIT	MICH.	650,000	.75-.45	.85-.55	.85-.55	.85-.55
JACKSON	MICH.	219,628			1.00-.90	1.00-.85
MINNEAPOLIS	MIN.	260,000	1.00-.85	.70 -	.95-.80	.92-.77
ST. PAUL	MIN.	235,000	1.20-1.00	1.10-.75	1.10-.75	1.05-.75
ST. LOUIS	MO.	800,000	.90-.50	.90-.50	.90-.50	.90-.50
JERSEY CITY	N.J.	513,673	1.00 -	.90-.55	.90-.55	.90-.55
NEWARK	N.J.	577,228	1.10-1.00	.90-.55	.90-.55	.90-.55
PATERSON	N.J.	232,656	1.10-1.00	.90-.55	.90-.55	.90-.55
BROOKLYN	N.Y.	1,454,763	.80 -	.95-.80	.80 -	.95-.80
BUFFALO	N.Y.	423,715	1.20-1.00	1.20-1.00	1.20-1.00	1.20-1.00
JAMAICA	N.Y.	284,041	1.00 -	1.00 -	1.00 -	1.00 -
MT. VERNON	N.Y.	288,330	1.50-1.00	1.50-1.00	1.50-1.00	1.50-1.00
NEW YORK	N.Y.	2,331,542	.80 -	.80 -	.80 -	.80 -
ROCHESTER	N.Y.	240,000	1.05-.95	1.05-.95	1.05-.95	1.05-.95
WOODHAVEN	N.Y.	284,041	1.00 -	1.00 -	1.00 -	1.00 -
CLEVELAND	OHIO	613,270	.85-.80	.85-.80	.85-.80	.85-.80
PORTLAND	ORE.	255,000	1.00-.95	1.00-.50	1.00-.55	1.00-.55
PHILADELPHIA	PA.	1,657,810	1.00 -	1.00 -	1.00 -	1.00 -
PITTSBURG	P.A.	483,905	1.20-1.00	1.20-1.00	1.20-1.00	1.20-1.00
PROVIDENCE	R.I.	250,000	.95-.85	.95-.85	.95-.85	.95-.85
SEATTLE	WASH.	250,000	1.25-1.00	1.25-.60	1.00-.60	1.25-.60
MILWAUKEE	WIS.	417,000	.75-.50	.75-.45	.75-.45	.75-.45



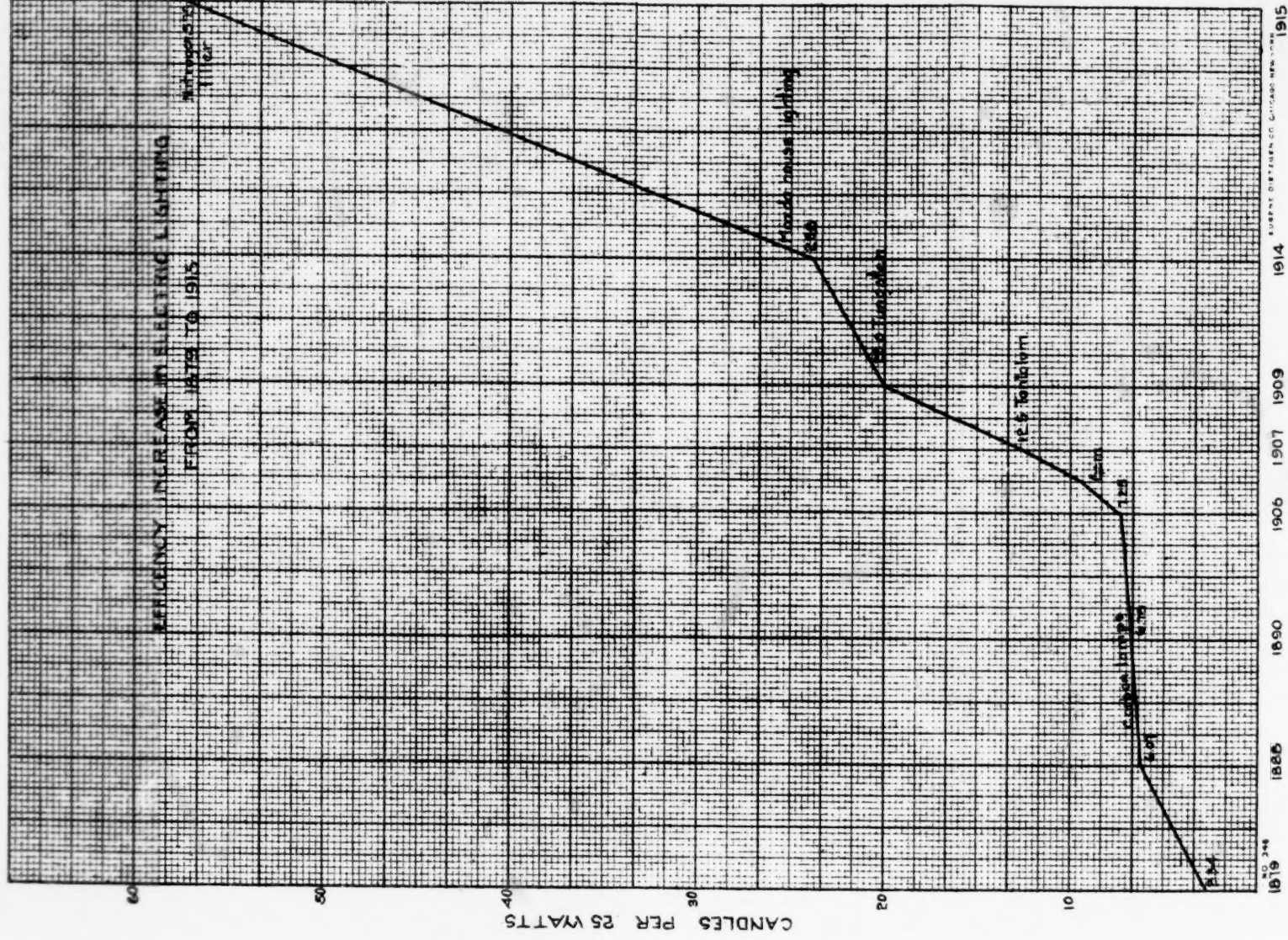


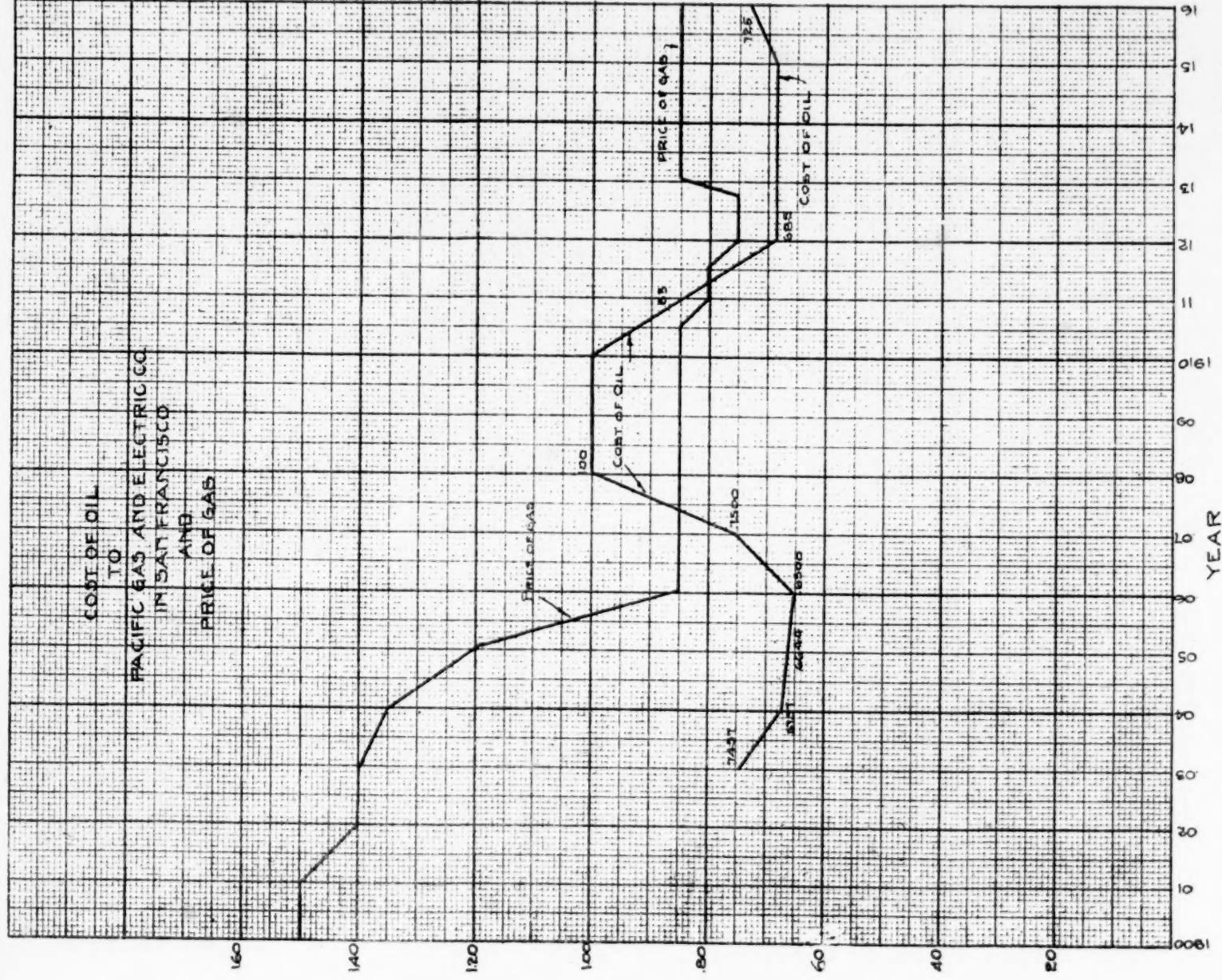


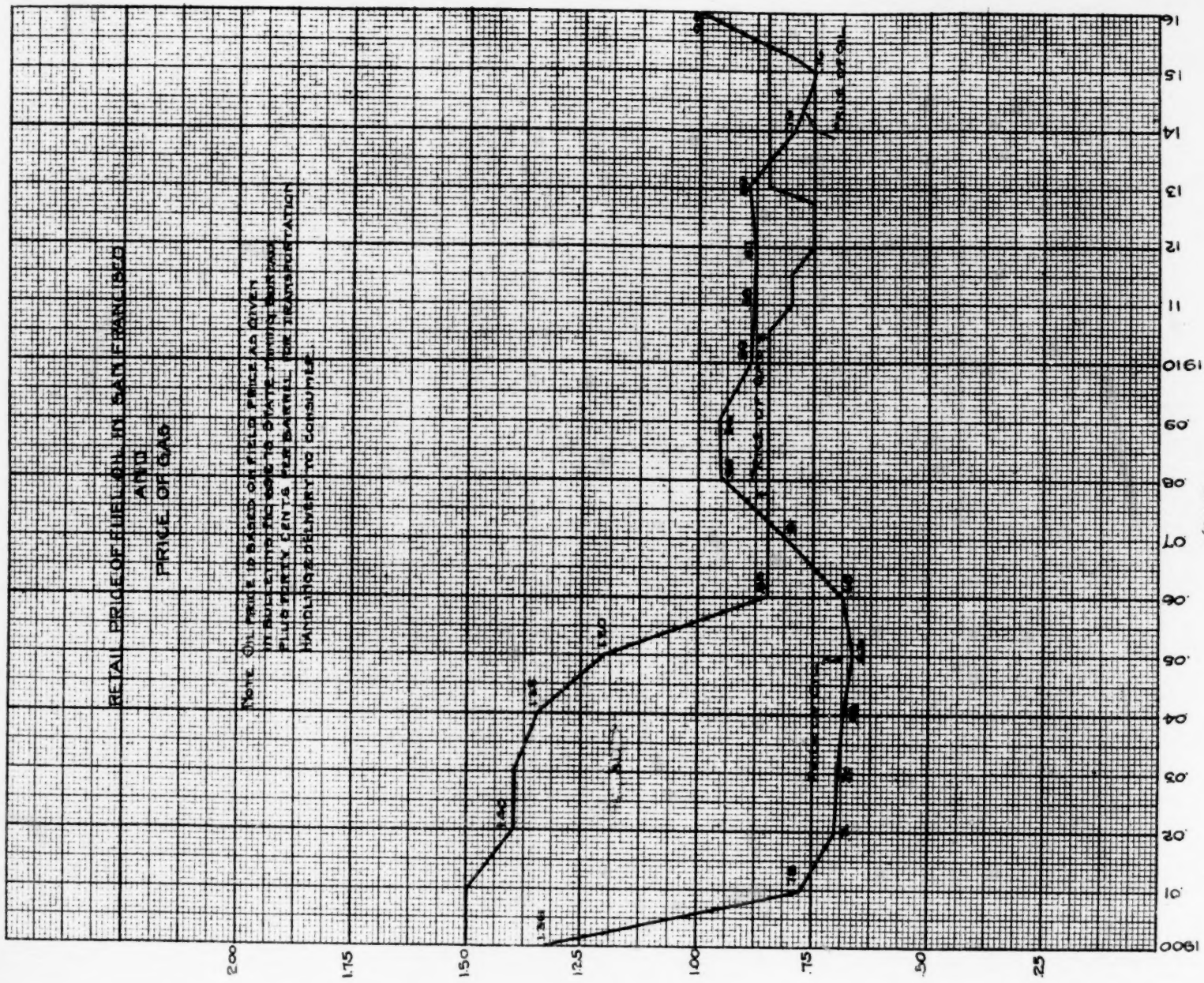
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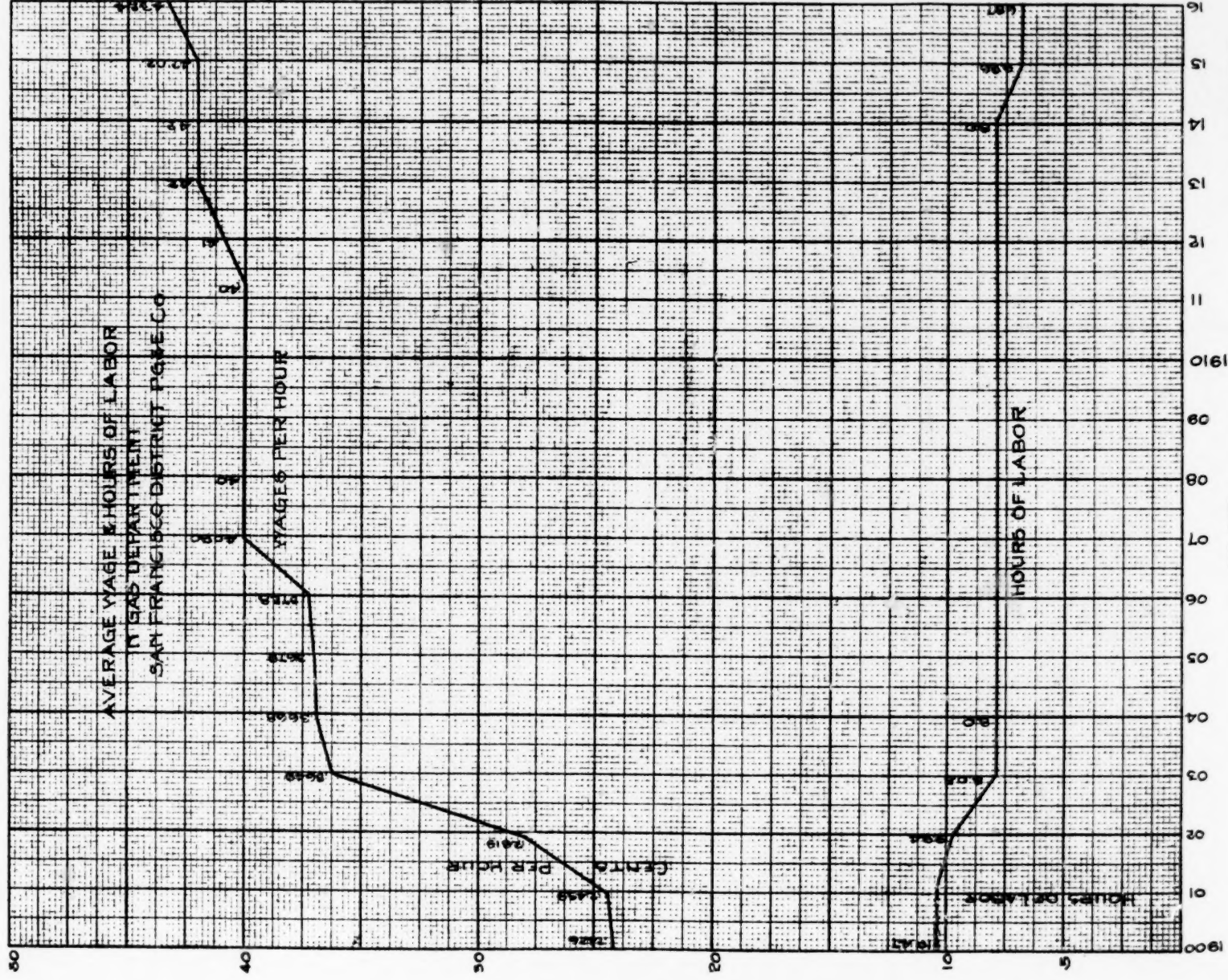






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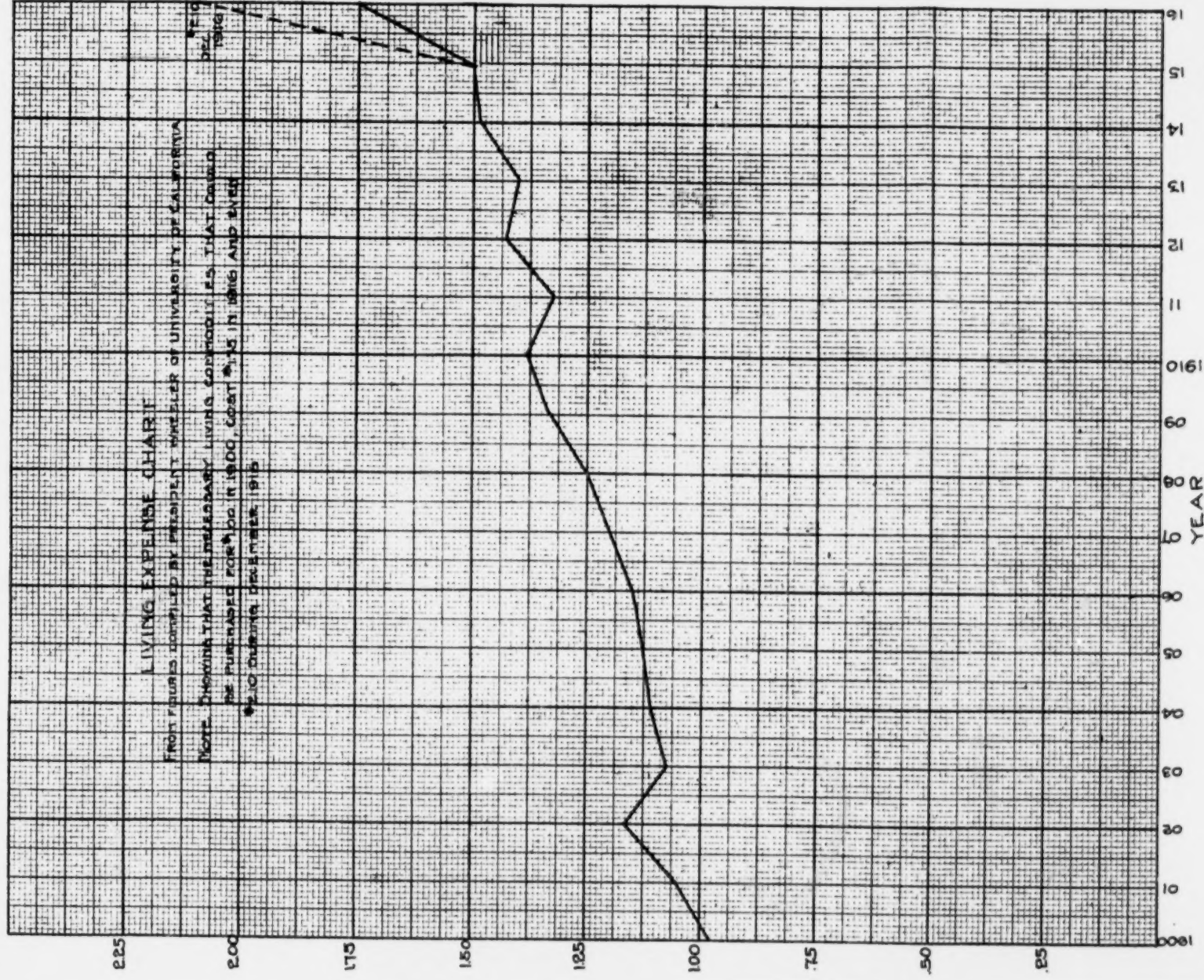
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YEAR

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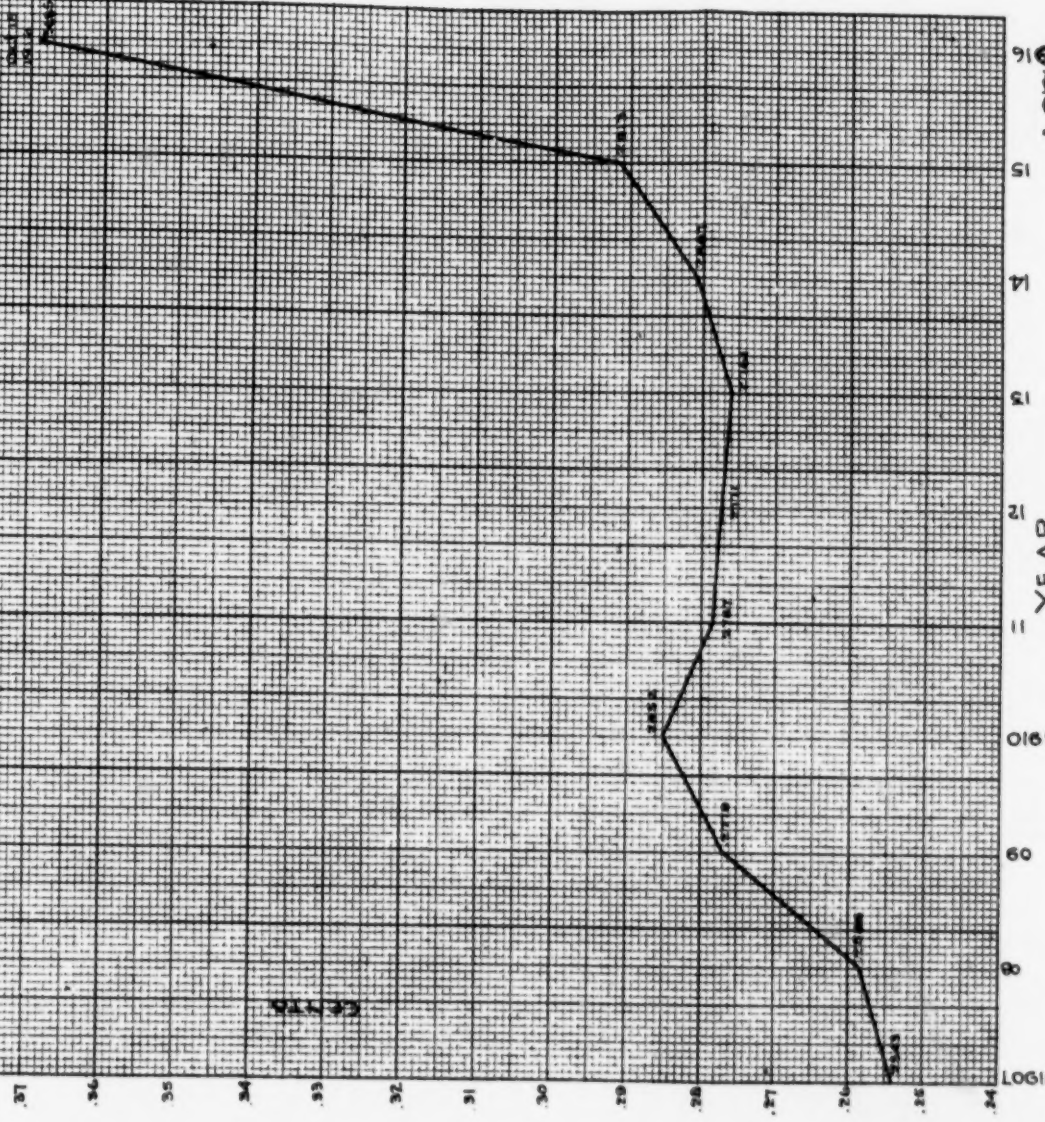


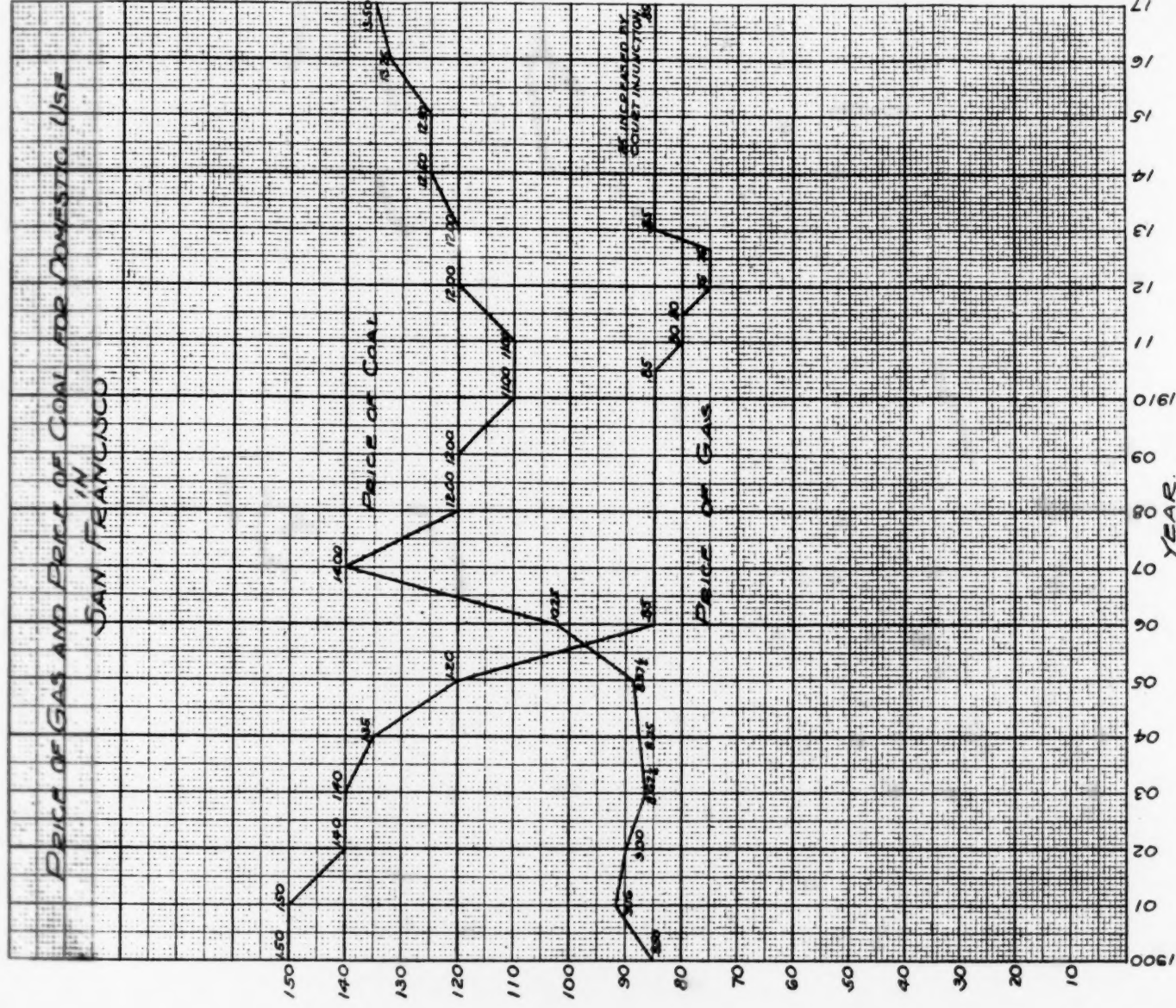
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COST OF FOODSTUFFS IN WESTERN STATES
GOVERNMENT REPORT
U.S. DEPARTMENT OF LABOR BULLETIN No 197

ARTICLE	1907	1908	1909	1910	1911	1912	1913	1914	1915	OCT-15 1916	1917
BEEF	.1457	.1493	.1553	.1663	.171	.1927	.2097	.2117	.2090	.244	
BUTTER	.365	.365	.390	.408	.380	.401	.404	.365	.351	.421	
EGGS	.333	.340	.362	.384	.370	.365	.376	.386	.362	.449	
FLOUR	.728	.774	.838	.811	.728	.737	.728	.755	.921	1.234	
LARD	.142	.143	.156	.176	.151	.161	.174	.170	.165	.194	
MILK	.082	.085	.086	.090	.090	.092	.093	.093	.091	.095	
PORK	.161	.165	.176	.202	.202	.200	.221	.232	.217	.240	
HAM	.217	.229	.237	.265	.265	.265	.288	.291	.282	.302	
POTATOES	.306	.271	.315	.284	.364	.290	.288	.240	.245	.424	
SUGAR	.063	.065	.064	.066	.066	.067	.059	.063	.070	.082	
AVERAGE	.2543	.2586	.2779	.2832	.2787	.2771	.2761	.2807	.2913	.3685	

COST OF FOOTWEAR IN WESTERN STATES
GOVERNMENT REPORT
U.S. DEPARTMENT OF LABOR BULLETIN NO 197







1667 E. C. JONES, a witness called by plaintiff, testified as follows:

I have made a study of the subject of gas rates in San Francisco and matters relating to the reasonableness of those rates with reference to the general industrial and economic conditions and have prepared a statement covering that study.

This statement has been prepared by the assistants in my office, under my direction, and is true to the best of my knowledge and belief.

This statement was introduced in evidence and marked "Plaintiff's Exhibit No. 52." A true copy of said Exhibit No. 52 is as follows:

1668 PLAINTIFF'S EXHIBIT No. 52.

Tables Showing:

1. Gas Rates in Cities of United States.
2. Price of Gas in San Francisco.
3. Decreased Cost of Gas Lighting.
4. Efficiency Increase in Gas Lighting.
5. Efficiency Increase in Electric Lighting.
6. Cost of Oil to Pacific Gas & Electric Company.
7. Retail Price of Fuel Oil and Price of Gas.
8. Average Wages and Hours of Labor.
9. Living Expense Chart—President Wheeler of U. C.
10. Cost of Foodstuffs in Western States—Table.
11. Cost of Foodstuffs in Western States—Chart.
12. Price of Gas and Price of Coal for Domestic Use.

(Here follow table and charts marked pages 1669 to 1680, inclusive.)

1681 The witness continued as follows:

In order to compare the prices charged for gas throughout the United States, I selected cities of over 200,000 population so as to have cases directly comparable to San Francisco. I obtained my information from what is known as "Brown's Directory of American Gas Companies," and I used the various editions of this directory for the years 1913-16. Brown's Directory is a standard work which has been compiled by E. C. Brown of New York for thirty years or more. I consider it to be reliable. I have checked over very carefully the information contained in this directory as regards output of gas, quantity of gas and price of gas with my knowledge of conditions throughout the United States. I find that, when gas companies are requested to report on matters of this kind, they either tell the
 1682 truth squarely for publication or refuse to give any information. I have noted cases where they have refused to reply to questions sent out by E. C. Brown but I have never found cases where there was a difference.

The first page is in the nature of general statistics. In obtaining these statistics I went further than to consult Brown's Directory and verified the information by communicating with the gas companies themselves in many of these cities. I am familiar with very many of these gas companies and the conditions that exist with regard to the manufacture and sale of gas. But in some instances I was in doubt as to how the rate was fixed—whether by regulation, franchise or by voluntary fixing of rates—so I telegraphed to several of the cities asking for an answer to the question as to how the rates were fixed. Those telegrams do not deal with prices but simply state the facts as to the way the rates are fixed.

Sheet 1 shows the cities of the United States that have a population of 200,000 and over. This does not represent the population of the municipalities but the population served by the companies in most of the instances; for instance, Detroit has a population of 650,000 and is supplying a suburban population of perhaps a 100,000 more. It is given as 650,000 in this table taken from Brown's Directory. The population shown here is for the year 1916 and is taken from the last edition of Brown's Directory. I consider that quite important because there have been some large increases
 1683 in population in these towns since 1916 owing to manufacturing activities; also large increases in the output of gas due to its use for other purposes. For instance, Detroit has increased its output of gas about three times in the last ten years while the population has not quite doubled. That was due to the automobile industry. The sales of gas in Detroit in 1916 were 6,500,000,000 cubic feet and the population of the districts supplied was estimated at 750,000. In 1906 the population of Detroit is given at 325,000 and the annual output of gas at 2,000,000,000 cubic feet.

I thought that Kansas City had more than 200,000 inhabitants. The gas plant at Kansas City is owned and operated by the United Gas Improvement Company of Philadelphia and, with the exception of its Philadelphia property, that company has refused to give in-

formation to Brown's Directory for several years. That is the reason that Kansas City is not reported here.

This list contains all the cities having a population of 200,000 or over from which reports concerning the gas business are available through Brown's Directory. There are a few cities in which the plants are owned by the United Gas Improvement Company that are not included here as that company will not give information 1684 to the directory. I did not feel like going to the United Gas

Improvement Company for information about the few cities they supply outside of Philadelphia. I thought that if they did not want to give it to the directory, they might not want to give it to me as an engineer. I feel that this list covers the country very well because it covers every kind of gas and practically every location that is affected by the different raw materials used for gas making such as coal, coke and oil.

Indianapolis is supplied by coke oven gas which is the by-product of the manufacture of coke. It is near natural gas territory but I do not know how much natural gas is sold in that city. This list includes the price of natural gas in Los Angeles and in some other places where artificial gas is mixed with natural gas.

The rate for gas in New York shown on page 1 for the years 1913-16 is 80¢ while in Brooklyn for the years 1914 and 1916 it is 95¢ to 80¢. These cities are in different districts and the plants are operated by different companies. The telegram I received from Brooklyn dated March 24, 1917, reads as follows:

E. C. JONES,

General Engineer, Pacific Gas & Electric Company:

Replying to your inquiry March 23, gas rates in Brooklyn, Jamaica and Woodhaven fixed by legislature but are under jurisdiction of public service commission. Do not register gas for industrial purposes separately from gas used for other purposes, but believe have a decided increase from that source, and that it is attributable to improved appliances and matter of education and possibly price compared with other fuel.

J. H. JOURDAN",

President of the Brooklyn Company.

1685 The rate for gas in New York was fixed by statute. This 80¢ rate was the rate involved in the litigation in the United States Courts in which the Consolidated Gas Company of New York was plaintiff.

The rate in Milwaukee runs from a top rate of 75¢ down as low as 45¢. I can only testify from my own knowledge of the cost of coal in Milwaukee. The general manager and engineer of the company is an old friend of mine and I talked with him at his works about the methods and cost of making gas. They are enjoying a very low price for coal. There is no other indication in this report why the gas should be so low.

1686 It would be almost impossible to compare the price of coal in Milwaukee with 68½ cent oil in San Francisco. There

is an excellent market in Milwaukee for by-products such as coke and tar and ammonia which is used as a fertilizer. The price of coal is so low that the coal less the by-products stands the company in Milwaukee nothing on its books. That is not true in all the eastern cities using gas because there is such a variation in the cost of coal. Even in cities where coal costs the same as in Milwaukee that would not necessarily be true. If we had coal at \$4.00 a ton in San Francisco, and we will presume it is Australian coal which would give us a yield of about 10,000 cubic feet to the long ton, the cost of coal for every 1,000 cubic feet of gas would be 40 cents. Now, in order to avail ourselves of the advantages of 40 cent coal in San Francisco it would be necessary for us to sell all of the coke, less the small amount used for heating the coal gas retorts, at a price approximating \$5.00 a short ton. It is a matter of population and a market for residuals. You might have cheap coal in Milwaukee and be able to market your by-products and make cheap gas; you might have cheap coal in another community where it was impossible to market the by-products. In the large cities around the Mississippi Valley, Chicago on one side, Detroit on the East, and St. Louis on the south, the gas companies have tremendous markets for all kinds of fuel. There coke never becomes a drug on the market and it never piles up in their yards as it does in San Francisco. The coal cost around the lakes would be somewhere near uniform in the very large cities and the companies would have the same opportunity to market their by-products unless they became their own competitor. For instance, Detroit gets its present success and standing entirely from the automobile. The automobile is practically made by the use of gas so that in Detroit coke must be shipped out in order to find a market for it.

The reason that Milwaukee has an advantage and can sell gas cheaper than St. Paul and Minneapolis is that it has a better market for its by-products. You must remember that coal gas, to be economical and possible in a community, must have in its immediate vicinity a market for its residuals, otherwise you have to charge a high cost for coal. The first charge on your books against the cost of gas is coal. You can divide the price of coal by ten; for instance, \$4.00 coal would be 40 cents per 1,000 cubic feet of gas.

In Milwaukee coal is about \$2.25 a ton which would be 22½ cents a thousand feet for coal. You would have to get enough for your by-products to reduce that 22½ cents to nothing in

order to make the engineer's statement of the Milwaukee Gas Light Company that his coal costs him nothing correct. In Milwaukee the breweries supply a market for all of the company's coke so that you can market it without any extra cost for transportation. In St. Louis there are breweries, but not to such an extent as in Milwaukee.

In Chicago the companies have been using coal for manufacturing coal gas and also oil for manufacturing water gas. They have been suffering from an increased price of oil in Chicago, and at the present time they are in an uncrystallized condition for they are changing to a coke oven system.

A ton of bituminous coal, such as we have been able to get from Australia or even from British Columbia, yields about 10,000 cubic feet of gas to the long ton of 2,240 pounds. With the new Jones process we have succeeded in getting 6,000 cubic feet of gas to a barrel of oil of 42 gallons. You must always remember that coal gas depends on the market for its residuals. There is not the population in California to take care of the immense amount of coke and tar that would be the by-products of coal gas manufacturer in San Francisco.

1689 The Philadelphia gas works was, I believe, the first municipal plant in the country. After it had been operated by the city for a great number of years it was found to be unprofitable and was leased to the United Gas Improvement Company of Philadelphia which has been operating it ever since. During the years 1913-1916 the price of gas has been \$1.00 per thousand cubic feet.

Sheet 2 is a chart showing graphically the price of gas in San Francisco during the period commencing in 1901 and down to 1916, according to the company's records.

Sheet 3 shows the decreased cost of gas lighting. It is made up of two figures, the price of gas in San Francisco and the improvement in gas-lighting appliances. Those two factors give us this line. You will notice that there is a slight rise in 1908, whereas the improvement in the efficiency of gas lighting has been constant. This was on account of the little rise in the price of gas in 1908. This curve, using 100 as the unit, or 1 as a unit, shows the advantages and the increasing advantages of gas for lighting to the consumers of San Francisco; that is, for what the consumer would have been compelled to pay \$1.00 in 1900, he now enjoys for slightly over 20 cents. The rapid drop from 1900 to 1906 was due to improvements in the incandescent gas burners, the invention of the invert type and other forms of air mixtures and mantle improvement.

1690 Page 4 shows the efficiency increase. The efficiency is based on the number of candle power per cubic foot of gas developed with different types of burners.

Page 3 means that considering the amount of candle power you are getting and the price you pay for gas, there has been a decrease from \$1.00 to 20½ cents. This only applies to gas for lighting purposes and is confined strictly to San Francisco.

Page 4 shows increased efficiency in gas lighting generally. It shows the development of the art of lighting by gas-improvements in the incandescent gas burner. That goes back to 1887 the very beginning. Before that there were only open-flame burners. This chart gives us the percentage of more light from a cubic foot of gas up to a point in 1914 where it is 703% more light. That point in 1914 should be taken as the efficiency available for every gas consumer for the reason that the line from 1914 to 1916 rapidly going up to 1,462% more light is due to the improvement in high-pressure gas lighting, such as we promoted at the Panama-Pacific Exposition. In order that consumers may avail themselves of that, they must be located on high-pressure mains. It is not possible in any city for all consumers to avail themselves of that efficiency. So in consider-

ing this chart, 1914 would be the point available to all consumers. 1916 shows what would be available only to consumers on 1691 the high-pressure lines. That is a pressure of $2\frac{1}{2}$ pounds to the square inch at the mantle.

I have not prepared a similar table showing the efficiency in gas for heating purposes, because that depends on many factors such as the development of gas stoves and the improvements in air mixers on the gas appliances; and more than that it depends on the personal equation, that is to say on the kitchen help. Take two gas appliances capable of doing an equal amount of work and place one in one hand and it will be very economical, and place another in another's hand and it will be wasteful. I have tried to construct charts like that, but have failed. I have tried to construct charts showing the exact relationship in value between fuel oil and gas and different kinds of coal and coke and gas, but I believe that such charts are misleading and of no value. The heat units can be computed but not compared. For instance, take a pound of oil, it would have about 19,000 British thermal units in it. If you compare that with gas having 600 or 550 British thermal units to the cubic foot, you might say that the oil is many times more valuable than the gas, and yet in the face of that, we are every day taking out oil installations in San Francisco and replacing them with gas. At the Palace Hotel sometime ago we displaced the entire oil installation of stoves,

1692 which they had used for a long time and had installed at great expense, with gas ranges. I thought at first that it might be on account of convenience and cleanliness, and when I say convenience I mean the advantages that accrue to being able to instantly get a fire by lighting it and instantly stopping the expense by extinguishing it. I have in mind the cooking late at night when it might be necessary to take care of a varying number of people in the restaurant, but on a closer study I found that it was done with the promise of economy and I find now that that promise has been fulfilled, that the Palace Hotel is doing its work more economically with gas than it was with oil, and yet the oil contains so many more British thermal units for a dollar. That is true of all kinds of solid fuel. Take a bituminous coal, for instance, with its high heating value, the only way that you can compare it with gas is by drawing on your imagination. Imagine that you must get up half an hour earlier in the morning and prepare a fire with paper and kindling wood and put on the coal and get it ignited and get it up to a cooking temperature to get breakfast, and then after you have gotten breakfast there is no way under the sun of removing its incandescent value and extinguishing it, it must burn itself

1693 out. So that instead of using 1,000 British thermal units to perform the work you have used 1,000 units plus 10,000 units wasted. With gas you get an immediate heat and when you have performed the work you extinguish the gas. I believe that gas as a domestic or industrial fuel is much more efficient than any other fuel, even more so than electricity as reported by the United States Bureau of Standards.

Chart 5 is a comparative chart showing the increased efficiency

in electric lighting. This is constructed on the historical development of the different kinds of incandescent electric lights, the carbon filament, the Gem, the Tantalum, the Tungsten and the Mazda house lighting, and finally the Nitrogen-filled Tungsten lamp. This group from 1914 to 1916 would be comparable to the rapid increase in the gas lighting chart from 1914 to 1916. Because the high-pressure gas arc and the nitrogen filled electric light would be probably used by the same class of consumers.

The Nitrogen-filled lamp is more expensive and it gives an intense light that must be subdued or used in large places and it gives off a great deal of heat. It is used a good deal in indirect lighting. This chart is simply to show that while gas lighting has increased in efficiency, it has had a fierce competitor in electric lighting 1694 that has also increased almost correspondingly in efficiency.

It has been a hard, uphill row for the gas company to keep up with the electric lighting in efficiency.

Chart 6 shows the cost of oil to the Pacific Gas and Electric Company in San Francisco, taken from our records. During the year 1916 to July 1st the price of oil was fixed by contract at 68½ cents, the average for the whole year was 72½ cents.

Chart 7 is an attempt to show the relative cost of fuel oil in San Francisco to consumers and the price of gas in San Francisco to consumers. In order to get the price of oil I went to all of the oil companies in San Francisco and to the Chamber of Commerce and also availed myself of prices actually paid by some consumers that I knew. From the information I obtained I constructed this line which I find to be very conservative; that is, I have found that it costs as much as 15 cents a barrel to deliver oil to some consumers in San Francisco by tank wagon. I have taken it for granted that an oil company in the business will put its storage tanks in proximity to its large consumers. For that reason I have allowed 7½ cents a barrel for local transportation. The rest of the price of oil is made up of field price plus the freight etc. With this price of oil to the consumers, to apartment houses and manufacturing establishments

and others, there has been a rapid increase and development 1695 in the use of gas for industrial purposes based on economy and not entirely on convenience and cleanliness. It is rather the actual saving in dollars due to using our gas at the present price for the manifold purposes for which oil and other fuels have been used.

Chart 8 shows the average wage and the hours of labor in the gas department in the San Francisco district from 1900 up to 1916. That is practically self-explanatory. The upper line shows the wages per hour; the reduction in the working hours is shown by the lower line. While in 1914 and 1915 there is a drop in the hours of labor, that is brought about by the fact that the company gave its regular monthly men a day a week off without loss of pay. As the gas business is a continuous operation we have no Sundays or holidays or nights. It is not a general reduction from the eight hour basis.

The increase in wages per hour in 1916 is due to the same cause that dropped the hours of labor. Giving a man a day a week off

without loss of pay divides the week on a different basis and raises the hourly wage.

Chart 9 is a living expense chart which I thought would be of interest in this case. It is from figures prepared by President

Wheeler of the University of California and contained in his 1696 annual report for the year 1916. This goes back to 1900

and takes in the period of litigation, so it seemed to me to relate to the case. It shows the upward tendency of every living commodity, everything necessary to living except gas.

Chart 10 contains information taken from Labor Bulletin No. 197, the cost of food stuffs in the western states and shows the increase in the cost of these different articles of food and the average.

Chart 11 shows the matter on chart 10 graphically, that is it takes the figures on chart 10 and combines them in an average line.

Chart 12 compares the price of coal delivered to domestic consumers in San Francisco with the price of gas.

You cannot compare coal and gas from the standpoint of utility to the consumer. The United States Bureau of Standards is now working on a new bulletin. They have found it impossible to compare the value of coal and gas without injury to the gas, because the coal contains so many more heat units per given weight, but there is so little of it that is really usable, most of the heat of coal is wasted. I believe gas will do the work in the kitchen for about one-half of the actual cost of coal.

1697 Mr. W. G. VINCENT, recalled for the plaintiff, testified as follows:

I have prepared a chart entitled "Average Sales of Gas per Consumer in San Francisco." This chart covers the period from the beginning of 1907 to the end of 1916. This chart shows the rates per thousand cubic feet of gas charged by the plaintiff and its predecessor, the San Francisco Gas and Electric Company, the monthly average consumption of gas per active meter, the annual average consumption of gas per active meter, and also the mean temperature during the entire period from 1907 to 1916.

The data employed in the preparation of this chart with respect to the rates charged, the number of consumers or active meters and the amount of gas consumed were compiled from the records of the plaintiff and the San Francisco Gas and Electric Company. The data employed in drawing the line indicating the mean temperature were taken from the reports of the United States Weather Bureau. I believe that the chart has been correctly compiled and that it correctly represents the matters which are indicated thereon.

The green line drawn on this chart representing the monthly average consumption of gas per active meter fluctuates so widely according to the season of the year that I thought it desirable to draw an additional line indicating the annual average consumption
1698 per active meter which would serve to straighten out the seasonal variation and indicate the general trend of the gas sales. Each section of the red line, that is to say, the part between two of the heavy black lines measuring the lapse of one month, represents the

average for that month and the next preceding eleven months; for example, the red line for the month of December, 1907, is one twelfth of the sum of all of the monthly averages for the twelve calendar months of 1907, and the next section of the red line, that is, the section for the month of January, 1908, is one twelfth of the sum of all of the monthly averages for the twelve months from February 1, 1907, to January 31, 1908; in other words, the red line for each month is one twelfth of the sum of the monthly averages for that month and the next prior eleven months. Up to 1912 there are two red lines, the upper one including the sales of the Metropolitan Light and Power Company and the lower excluding that company's sales.

This chart indicates that the average consumption of gas per active meter has been diminishing,—the general trend has been downward throughout the period from 1907 to 1916. In the preparation of this chart the gas sold for street lighting, the gas sold to the Panama-Pacific Exposition and the gas sent down the peninsular to the Redwood District have all been excluded.

The Master:

Q. And you draw from that the fact that as the rate is reduced this would show no increase of consumption but rather the
1699 contrary so far as the average consumer was concerned?

A. The general trend of the average sales has been downward in spite of efforts to develop industrial business, installations of appliances such as commercial arcs, and the installation of heaters, etc. Our fluctuations from time to time are covered somewhat by the weather conditions, and possibly, in part, by the rate. The tendency of the decrease does not seem to be very much affected by the rate, if at all; the rise in the red line, beginning in the middle of 1915 and extending down to the middle of 1916, is unquestionably due to the indirect influence of the Exposition, that is, the increase in sales to the inhabitants of San Francisco due to exposition visitors and the general condition of the requirements of gas.

Mr. Bosley:

Q. I would like to have you comment on the increase in the average sales during part of 1912 and extending well into 1913.

A. The increase in 1913 begins with the latter part of 1912 and seems to be due almost entirely to weather conditions during that winter, when the average temperatures were lower than normal, January being very much below in average temperature, which is reflected in the January and February sales being higher than the average—the green lines.

Mr. Searls:

Q. That is just a conclusion on your part, is it not, Mr. Vincent?

A. That is a conclusion on my part after studying the
1700 facts. The reduction in rate there is from 80 to 75 cents in July 1912, and was not followed by any increase at all in the sales; the sales did not begin to increase until November, 1913.

Q. It took people a little while to find out that their bills were being cut down and they could afford to use more gas?

A. There was a reduction of 5 cents in the rate at that time. There was a reduction in the beginning of 1912 of 5 cents; there was a reduction of 15 cents in July, 1911, and sales continued to drop off after that with no increase. I think the rise in 1913 is due more to weather conditions than anything else.

Mr. Bosley:

Q. The corresponding section of curve showing the temperature shows a lower temperature during that period. The curve shown in green shows a larger sale, especially during the months when the temperature was the lowest.

A. Yes; the sales in January, 1913, the average was higher than it was two years before, or the two subsequent years.

Mr. Bosley: We do not contend that the reduction in price was without effect, but that there were some other concurrent causes which did operate to affect the amount of gas sold.

1701 The Master:

Q. Do you gather from this that at \$1.00 per thousand cubic feet people would use more on an average?

Mr. Bosley: No, I would not gather that.

A. I think the reason for the dropping off of sales is more influenced by the general economic and political conditions than it is by the price of gas.

Mr. Bosley:

Q. I am not sure whether Mr. Vincent is in a position to testify on this point or not, but I would like to ask him if he knows whether or not the use of apartment houses in the city and county of San Francisco has developed very much during this period of time and has resulted in a smaller individual use of gas?

A. Yes, I can testify that the apartment houses have developed very much in the last ten years; I think that has been one of the large factors in reducing the average sales per consumer—the large number of apartment houses, where there is a small use of gas per month, the people living in those apartments cooking possibly one meal a day and being very frequently off on trips and using only a little bit over the minimum, if that much.

Q. And there has been another point brought out by Mr. Holberton, that the efficiency of the electric-lighting appliances has been increased to a marked degree since 1907, and also that the wiring of houses for the use of electricity has gone on apace, and that with newer construction provision for the use of gas for illumination has not been made in architects' plans in general:

1702 Is that correct, Mr. Vincent?

A. Yes.

The chart concerning which the witness had testified was thereupon admitted in evidence and marked plaintiff's Exhibit No. 68. A true copy of said Exhibit No. 68 is attached hereto.

(Here follows chart marked page 1703.)

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MONTHLY MEAN TEMPERATURE

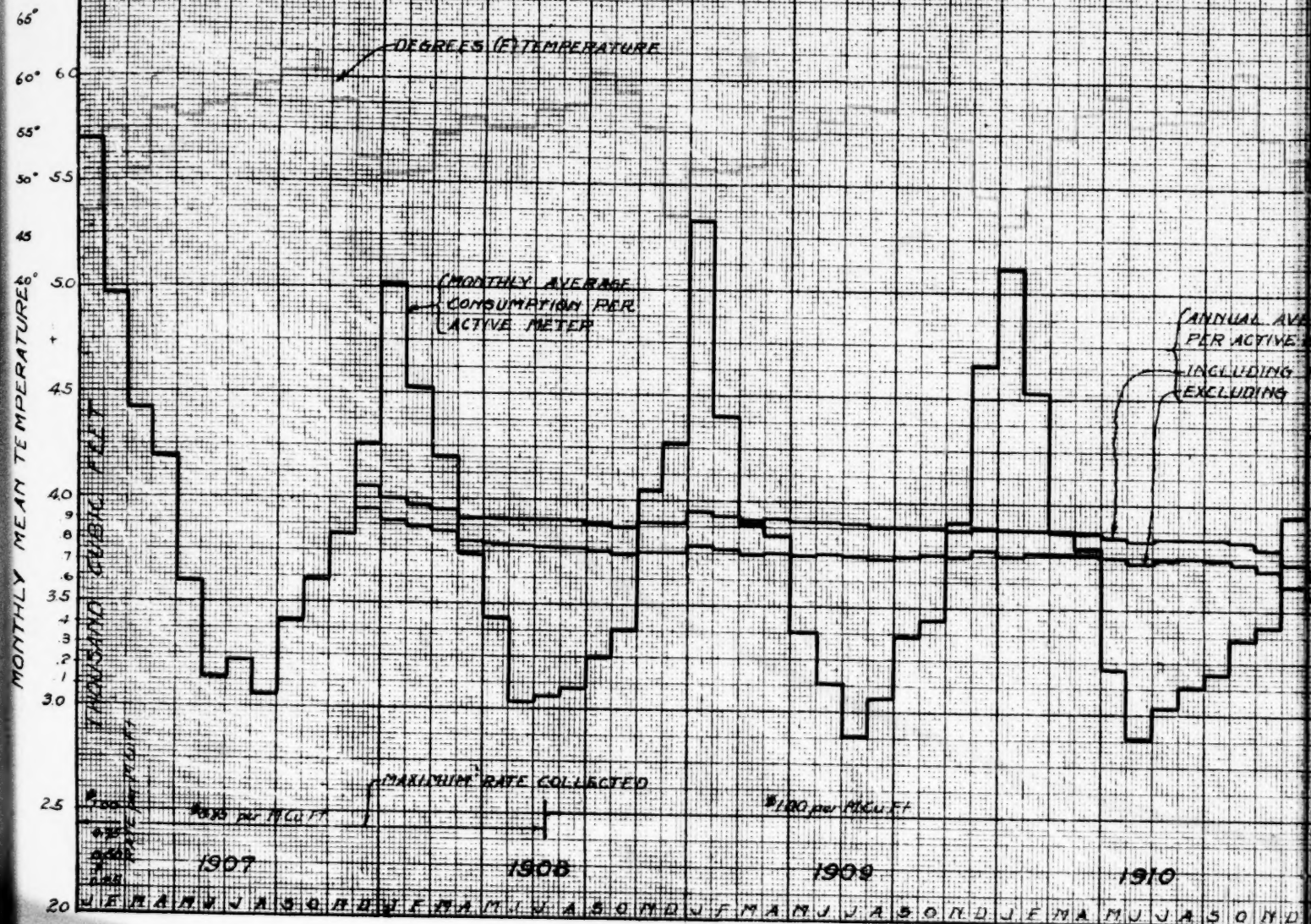
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AVERAGE SALES OF GAS PER CONSUMER SAN FRANCISCO



AVERAGE SALES OF GAS PER SAN FRANCISCO

DEGREES TEMPERATURE

AVERAGE CONSUMPTION
METER PER MONTH -
METROPOLITAN CO SALES

(MONTHLY AVERAGE
CONSUMPTION PER
ACTIVE METER



AVERAGE SALES OF OMS PER CONSUMER
SAN FRANCISCO

DEGREES (TEMPERATURE)

MONTHLY AVERAGE
CONSUMPTION PER
ACTIVE METER

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1704 Mr. W. G. VINCENT, a witness recalled for the plaintiff, testified as follows:

I have caused to be prepared under my direction a statement entitled "Analysis of gas sales and consumers, months of October 1905-1913 and March 1914-1915-1916; percentage of total gas sold and percentage of total number of consumers using different quantities of gas."

This statement consists of two sheets giving the percentages, as I will explain in a moment, and two charts on which the percentages are plotted, and is based on Exhibits numbered 63 and 69.

This statement was admitted in evidence and marked Plaintiff's Exhibit No. 70. It is not deemed necessary to include the charts mentioned above in this statement. The two sheets of said Exhibit No. 70 which give the percentages are in the words and figures following:

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Gas Sales and Consumers, Months of October, 1905-1913, and March, 1915, 1916, Percentage of Consumers Using Not More Than a Given Quantity of Gas During Month.—Percentage of Gas Used by Consumers Using Not More Than a Given Quantity During Month.

Quantity of Gas Used Per Month, Cubic Feet.

Year.	Consumers using less than					Quantity of Gas Used Per Month, Cubic Feet.					Percentage of Gas Used by Consumers Using Not More Than a Given Quantity During Month.					Percentage of Consumers Using Not More Than a Given Quantity During Month.				
	600.					1,000.					1,500.					2,000.				
	Per cent.	Gas used.	Cons.	used.	Per cent.	Per cent.	Gas used.	Cons.	used.	Per cent.	Per cent.	Gas used.	Cons.	used.	Per cent.	Per cent.	Gas used.	Cons.	used.	Per cent.
1905.....	7.2	1.3	17.4	28.3	0.3	44.9	19.3	64.3	35.7	63.9	100	35.7	63.9	100	35.7	63.9	100	35.7	63.9	100
1906.....	4.0	6	9.7	17.2	4.7	30.4	11.3	52.1	47.9	73.4	100	47.9	73.4	100	47.9	73.4	100	47.9	73.4	100
1907.....	5.0	7	11.7	20.1	5.5	34.3	12.6	55.5	44.5	72.3	100	44.5	72.3	100	44.5	72.3	100	44.5	72.3	100
1908.....	8.2	9	16.3	27.1	7.3	43.7	16.2	65.4	34.6	66.9	100	34.6	66.9	100	34.6	66.9	100	34.6	66.9	100
1909.....	7.2	8	14.9	24.9	6.6	41.9	15.6	64.4	35.6	67.6	100	35.6	67.6	100	35.6	67.6	100	35.6	67.6	100
1910.....	8.3	9	16.9	27.6	7.5	45.0	16.9	67.4	32.6	66.0	100	32.6	66.0	100	32.6	66.0	100	32.6	66.0	100
1911.....	8.5	9	17.5	31.5	9.1	47.0	18.1	69.4	34.0	63.9	100	34.0	63.9	100	34.0	63.9	100	34.0	63.9	100
1912.....	9.7	1.0	19.6	34.4	9.7	49.4	18.2	70.5	29.5	63.1	100	29.5	63.1	100	29.5	63.1	100	29.5	63.1	100
1913.....	11.6	1.4	22.8	35.8	10.4	53.4	20.9	73.5	26.5	52.2	100	26.5	52.2	100	26.5	52.2	100	26.5	52.2	100
1914.....	10.0	1.2	21.2	34.0	9.1	51.6	18.4	71.1	28.9	66.9	100	28.9	66.9	100	28.9	66.9	100	28.9	66.9	100
1915.....	10.2	1.2	22.1	35.0	8.8	51.9	17.1	70.5	29.5	68.8	100	29.5	68.8	100	29.5	68.8	100	29.5	68.8	100
1916.....	9.9	1.1	20.9	33.8	8.8	50.9	17.5	70.8	29.2	68.0	100	29.2	68.0	100	29.2	68.0	100	29.2	68.0	100

1707 This statement is more or less self-explanatory and is simply made up by taking the information contained in Exhibits 63 and 69 and working out into percentages first the number of consumers in each class as defined in Exhibit No. 63, and second, the gas used by consumers in each class for each year from 1905 to 1916.

This statement is correct to the best of my knowledge and belief.

I have also prepared a statement entitled "Analysis of Gas Consumers and Gas Sold, Average Month—October, 1914."

This statement, which consisted of one page of tabulated figures and one chart on which the same were plotted, was admitted in evidence and marked "Plaintiff's Exhibit No. 71. Said chart is not essential for the purposes of this statement. Sheet 1 of said Exhibit No. 71 is in the words and figures following:

Pacific Gas and Electric Company, San Francisco District, Gas Department.
Sold, Average Month October, 1914.

PAC. GAS & ELEC. CO. VS. CITY & CO. OF SAN FRAN.					967	
(A)	(B)	(C)	(D)	(E)	(F)	(G)
Gas used, M cu. ft.	No. cons. using each different quantity.	No. cons. using not more than given quantity.	% cons. using not more than given quantity.	Total gas used by each group of cons. M cu. ft.	Total gas used by con- sumers using not more than given quantity, M cu. ft.	% gas used by con- sumers using not more than given quantity.
.1	216	216	.2	21.6	21.6	.2
.2	2,513	2,729	2.6	502.6	524.2	.2
.3	279	3,008	2.9	83.7	607.9	.6
.4	3,343	6,351	6.1	1,337.2	1,945.1	.6
.5	245	6,596	6.3	122.5	2,067.6	.6
.6	4,450	11,046	10.6	2,670.0	4,737.6	1.4
.7	223	11,269	10.8	156.1	4,893.7	1.4
.8	5,301	16,570	15.8	4,240.8	9,134.5	2.7
.9	217	16,787	16.1	195.3	9,329.8	2.8
1.0	6,373	23,160	22.0	6,373.0	15,702.8	4.6
1.1	186	23,346	22.3	204.6	15,907.4	4.7
1.2	6,483	29,829	28.5	7,779.6	23,687.0	7.0
1.3	204	30,033	28.7	265.2	23,952.2	7.1
1.4	6,626	36,659	35.1	9,276.4	33,228.6	9.8
1.5	193	36,852	35.2	289.5	33,518.1	10.4
1.6	6,478	43,330	41.4	10,364.8	43,882.9	13.0
1.7	197	43,527	41.6	334.9	44,217.8	13.1
1.8	6,104	49,631	47.5	10,987.2	55,205.0	16.3
1.9	137	49,768	47.6	260.3	55,465.3	16.4
2.0	5,812	55,570	53.1	11,624.0	67,089.3	19.8
2.1	164	55,744	53.3	344.4	67,433.7	19.9

Analysis of Gas Consumers and Gas Sold.—Continued.

(A)	(B)	(C)	(D)	(E)	(F)	(G)
Gas used, M cu. ft.	No. cons. using each different quantity.	No. cons. using not more than given quantity.	% cons. using not more than given quantity	Total gas used by each group of cons., M cu. ft.	Total gas used by con- sumers using not more than given quantity, M cu. ft.	% gas used by con- sumers using not more than given quantity.
2.2	5,083	60,827	58.2	11,182.6	78,616.3	23.2
2.3	111	60,938	58.3	255.3	78,871.6	23.3
2.4	4,573	65,511	62.6	10,975.2	89,846.8	26.5
2.5	92	65,603	62.7	230.0	90,076.8	26.6
2.6	4,037	69,640	66.6	10,496.2	100,573.0	29.7
2.7	94	69,734	66.7	253.8	100,826.8	29.8
2.8	3,475	73,209	70.0	9,730.0	110,556.8	32.6
2.9	82	73,291	70.1	237.8	110,794.6	32.7
3.0	3,125	76,416	73.1	9,375.0	120,169.6	35.5
3.1-3.5	5,200	81,616	78.0	17,114.8	137,284.4	40.6
3.6-4.0	5,449	87,065	83.3	20,593.8	157,878.2	46.6
4.1-4.5	2,630	89,695	85.8	11,291.7	169,169.9	50.0
4.6-5.0	2,852	92,547	88.5	13,662.2	182,832.1	54.0
5.1-6.0	3,104	95,651	91.5	17,236.7	200,068.8	59.1
6.1-7.0	1,900	97,551	93.3	12,483.1	212,551.9	62.8
7.1-8.0	1,306	98,857	94.5	9,878.1	222,430.0	65.7
8.1-9.0	900	99,757	95.4	7,726.7	230,156.7	68.0
9.1-10.0	727	100,484	96.1	6,961.8	237,118.5	70.0
10.1-15.0	1,790	102,274	97.8	21,766.7	258,885.2	76.5
15.1-20.0	787	103,061	98.5	13,606.0	272,491.2	80.5
20.1-30.0	741	103,802	99.3	17,970.4	290,461.6	85.9
30.1-40.0	292	104,094	99.5	10,078.5	300,540.1	88.8
40.1-50.0	167	104,261	99.6	7,432.4	307,972.5	91.0
50.1-567.8	320	104,581	100.0	30,255.9	338,228.4	100.0

1709 This statement gives the number of consumers using each different quantity of gas for the month of October, 1914, the quantities being tabulated by hundreds of feet up to 3,000 feet, and then by 500 feet up to 5,000 feet, and then by 1,000 foot blocks up to 10,000, and so on, the next blocks being 5,000 foot blocks up to 20,000, and then 10,000 foot blocks up to 50,000, and one block over 50,000 feet. This tabulation was made up by me from information taken off the San Francisco District books a couple of years ago. I desired to get some information as to the number of consumers using each quantity of gas, in order to see the proportion between small consumers and large consumers, and the relative quantity of gas sold to the various consumers of each class. The San Francisco District furnished to me from their ledgers the information in the first two columns marked "A" and "B" of this sheet one. Columns "C" to "G" were simply computations made from the information furnished in the first two columns. Column C is the number of consumers using not more than a given quantity, and is simply a cumulation of the number of consumers in Column B. For instance, while the column headed "B" gives the number of consumers using each different quantity,

column C gives the cumulation of consumers using all small quantities and up to the quantity of which the number is given. Column D gives the percentage of total consumers as in Column C. Column E gives the gas used by each group of consumers in thousands of cubic feet. Column F indicates the percentage of totals.

This is an interesting study, for instance, you will see that 91½% of the consumers used 59½% of the gas and 53.1% of the consumers used only 19.8% of the gas. The consumers using not more than 1,000 cubic feet of gas represent 22% of the total number and they used only 4.6% of the total gas used. This tabulation covers only consumers who actually used at least 100 cubic feet of gas, those consumers using less than 100 cubic feet are not shown at all.

The quantity of gas used in October, 1914, was slightly below 1/12 of the entire amount used in that year, being approximately 8.05% of the entire year's sales.

1711 Mr. W. G. VINCENT, a witness recalled for the plaintiff, testified in substance as follows:

I have made an analysis and study of the cost of manufacturing and distributing gas in San Francisco in the years 1913-14 and 1915-16 based upon the exhibits that have heretofore been introduced in this case showing the appraised value of the properties and the revenues and expenses. Previous to making that analysis I had also made at various times various other kinds of analyses of the operating costs in San Francisco. This is not the first analysis I have made of these costs. I re-studied the entire subject in connection with the exhibits in this case showing the appraised value of the properties and the revenues and the expenses. I have put the results of my study and investigation into a statement containing complications of figures.

This statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 73.

Before reading this statement, I wish to call particular attention to the fact that this is an analysis of costs, that is, it is an attempt to analyze very carefully the costs of supplying gas to consumers in San Francisco, and should not be confused with the making of rates. While costs naturally enter into the determination of proper rates, the two matters are separate subjects. Said statement reads as follows:

1712 *Pacific Gas and Electric Company, San Francisco District, Gas Department. Analysis of Costs, Year 1915-1916.*

General:

The following is a brief discussion and detailed analysis of the cost of supplying gas to consumers in San Francisco during the year 1915-1916.

Variables Affecting Costs:

Physical, geographical, economic and climatic conditions introduce variables in the costs of different gas utilities as do features of design and construction. A congested territory, proximity to oil or coal fields and transportation facilities make it possible for one utility to produce gas at a lower cost than another not so favorably located.

Those conditions governing the operating and design which affect the costs may be called internal, and the conditions imposed upon the utility by the requirements of the field it is supplying may be called external conditions.

It is the purpose of this analysis to deal more particularly with the latter or external conditions affecting costs, and to make some suggestions as to their effect on costs in general and the influence of certain of those external conditions on the various items of costs. For instance, we all clearly recognize that to take the total cost of a gas utility and divide this cost by the total gas sold will give us an

average cost per 1,000 feet sold, but we also recognize that
 1713 the cost of supplying consumer A, who uses 1,000 feet, cannot be obtained by multiplying this cost by A's consumption, nor can the cost of supplying consumer B, who uses 100,000 feet, be obtained by this method.

In a broad way there are certain definite external requirements, which every gas utility has to meet in supplying its patrons and these requirements largely determine the costs of service; briefly stated, they are: 1st—the number of consumers. 2nd—The maximum demand upon the plant made by the consumers. 3rd—The amount of gas required by the consumers during a given period of time.

These conditions are not peculiar to the gas business, but are recognized to a large extent as determinative of the cost of service in other classes of utility service, such as water, telephone, electric, street railway, etc., and also find their analogies in many other lines of business.

With the necessity of meeting these requirements recognized, all costs may be classified as "consumer," "demand," "output" or "overhead," as they are found to be influenced by these factors. For example, the cost of reading meters may be classed at once as varying with the number of consumers and not affected in any way by a change in the demand or the output; again, the cost of oil for gas is almost a direct function of the amount of gas manufactured.

In this way each cost may be considered separately and
 1714 classified by testing with the query as to whether the figures would be modified by a change in any of the variables.

Certain costs will be found to be affected by a change in more than one variable and in such cases a more or less arbitrary apportionment has to be made. Other costs will also be found, constituting a small part of the total, which have no direct relation to any of the three and these will also have to be distributed arbitrarily.

Reducing the above to specific terms, we may define the following four classes:

1st. Consumer Costs.—Which include all costs that are directly affected only by a change in the number of consumers and a portion of those costs that are affected by such a change, but also affected by a change in either the maximum demand or the output, or both.

2nd. Demand Costs.—Which include all costs directly affected only by a change in the maximum demand and a portion of those costs that are affected by a such a change, but also affected by a change in either the number of consumers or the output, or both.

3rd. Output Costs.—Which include all costs directly affected only by a change in the output and a portion of those costs that are affected by such a change, but also affected by a change in either the number of consumers or the maximum demand, or both.

1715 4th. Overhead costs—which include all costs not directly affected by changes in either the number of consumers, the maximum demand, or the output.

These groups are generally accepted as being the proper basis for dividing costs, as evidenced by the following:

(Report of Committee on Differential Rates of the National Commercial Gas Association.)

“We assume four major groups of expense or cost. General Cost, Customers Cost, Demand Cost and Output Cost.

“The General Cost is made up of these overhead costs which are not affected by either the immediate number of customers, size of plant or output of gas.

“The Customers Cost includes all expenses and charges from the inlet of the meter to the receipt of money in the cashier's till.

“The Demand Cost includes all expenses and charges incidental to having a plant of adequate capacity to meet the Maximum Demand ready with heats up and gas at all meters, but not actually making any deliveries through the customers meters.

“The Output Cost includes all expenses incidental to the additional production of gas for actual passage through the customers' meters after and over and above all Demand Costs.”

(Differential Gas Rates in Baltimore, by Douglass Burnett, in the Baltimore Gas and Electric News for January, 1916.)

1716 “The expense accounts of the Company are carried under the usual headings of manufacture, distribution, commercial expense, general expense, new business expense, and taxes, and this, together with the net earnings constitute the gross income. The amounts of these costs for the fiscal year were allocated under the headings of

“(a) Costs chargeable per customer.

“(b) Costs chargeable per thousand cubic feet per hour of customer's demand.

“(c) Costs chargeable per thousand cubic feet of consumption.

“These three cost amounts were respectively divided as follows:

“(a) By the number of customers to obtain the unit cost per customer per year,

“(b) By the estimated aggregate customers' demand to obtain the unit cost per thousand cubic feet of customer's maximum demand, and

“(c) By the annual sales in thousands of cubic feet to obtain the unit cost per thousand cubic feet of consumption.”

While the above definitions differ to some extent and there will probably be differences of opinion as to the distribution of individual items under any one of the definitions, if the general principles are

accepted, the results in the main will not be materially affected. One of the most difficult groups of costs to classify is that incidental to the street mains, which are certainly, to some extent, dependent upon the number of consumers, but also dependent upon the demand and the output. Just what portion of these costs should be charged 1717 to each group is difficult to determine and I have divided them equally between the three, as the Wisconsin Railroad Commission has done in several cases.

(From Decision of Wisconsin Railroad Commission, City of Milwaukee vs. Milwaukee Gas Light Co.)

(Decided August 14, 1913.)

"In analysing the cost of distributing gas, it will be seen that a considerable portion of the distribution expense is determined by the extent of the system. The extent of the system is very largely influenced by the number of consumers. It would seem just, therefore, to apportion to the consumer a part of the distribution system; for example, the average number of feet of main which the consumer uses based upon the smallest size pipe laid. Of the investment in additional size some should be apportioned to capacity and some to output. Some of the expenses of operation vary with output. It is extremely difficult to apportion these various items with great accuracy. It would seem fair, however, to apportion such items as street department labor, street department expense, and maintenance of distribution, buildings and grounds, one-third to capacity, one-third to output and one-third to consumer."

Segregation of Demand and Output Costs:

Theoretically, an accurate and complete segregation of costs between different classes of consumers, or between individual 1718 consumers, should include a segregation between demand and output costs, in order that the costs incidental to and created by the peak demand upon the plant may be equitably distributed between those responsible for this demand, either as individuals or classes of consumers. In practice, however, no definite line can be drawn between the two costs, so that any segregation would of necessity be based to a very considerable extent upon assumptions and judgment after considering all relevant matters. Then, too, the segregation between demand and output costs is only of value where class or individual load factors differ, or there are differences in the time of class or individual demands.

The equitable distribution of the demand costs requires a knowledge of the existing diversity factors and also introduces another very difficult problem; namely, in prorating charges, what relative weight should be given to "on-peak" and "off-peak" demands?

At the present time we have little detail knowledge of load factors, time of demand and diversity factors and hence an application

of the demand costs would involve so many assumptions that the results obtained would be of little value. To illustrate these difficulties in the application of the demand cost, suppose we determined that the total demand cost was X dollars and we had 1,000 consumers all of the same class. In order to distribute the demand costs against the consumers we would have to determine the demand of each and then divide the total plant demand cost by the sum
1719 of the individual demands to obtain the unit cost of the consumers' demand. Now suppose these consumers were of two classes, 100 industrial and commercial consumers and 900 domestic, and we desired to divide the plant demand costs between the two classes. In order to do this we would have to determine the resultant demand on the plant caused by each class and then proportion the plant demand cost in proportion to the class demands.

A careful segregation between demand and output costs is very generally regarded as essential in analyzing the costs of supplying electric power where the question of load factor is such an important element, but for gas utilities, where, unlike the electric utilities, it is not necessary to provide generator capacity capable of supplying maximum instantaneous demands, load factor is not nearly so important, and it would seem advisable for those of us who are analyzing gas costs to give careful consideration to the necessities of the case before becoming involved in the complications which, of necessity, result from an attempt to segregate and distribute equitably the demand cost as distinct from output costs.

With these practical difficulties of the segregation and application of the demand costs in mind, I have deemed it unnecessary to make such a segregation in this analysis, but have included demand and output costs together under the general head of "output" costs.

1720 (The rest of Exhibit No. 73 consists of tabulated statements and a chart which contain the witness' analysis of plaintiff's San Francisco gas department costs for the fiscal year 1915-16. A true copy of said tabulated statements and chart follows:)

1721

PLAINTIFF'S EXHIBIT NO. 73, PAGE 7.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive.

Costs :	Prorated to—			Per cent prorated to—			
	Total.	Street lighting.	Consumers.	Output.	St. lgt.	Cons.	Output.
Maintenance of Generating Capital....	\$70,364.81	\$1,913.92	.....	\$68,450.89	2.72	.....	97.28
Maintenance of Transmission Capital....	1,797.72	35.88	\$476.78	1,285.06	2.00	26.52	71.48
Maintenance of Distribution Capital (Excluding Acct. 1605).....	116,302.80	3,591.78	81,845.73	30,865.29	3.09	70.37	26.54
Generating Expenses.....	1,025,446.50	27,892.14	.....	997,554.05	2.72	.....	97.28
Transmission Expenses.....	50,470.01	1,372.78	.....	49,097.23	2.72	.....	97.28
Distribution Expenses (Excl. Acct. 1907).	590,134.33	107,676.96	373,292.51	109,164.86	18.25	63.35	18.50
Total Maintenance & Operating Expenses (Excl. Accts. 1605 & 1907)	1,854,515.86	142,483.46	455,615.02	1,256,417.38	7.68	24.57	67.75
Maintenance of Distribution Capital— Acct. 1605.....	7,719.83	.....	.....	.....	.....	.....	.....
Distribution Expense Acct. 1907.....	28,584.43	.....	.....	.....	.....	.....	.....
Total Maintenance & Operating Expenses	1,890,820.12	.....	.....	.....	.....	.....	.....

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Inclusive—Continued.

Costs:	Total.	Prorated to—		Per cent prorated to—			
		Street lighting.	Consumers.	Output.	St. lgtg.	Cons.	Output.
Taxes	205,442.47	10,231.04	36,692.03	158,519.41	4.98	17.86	77.16
Floating Debt Interest.....	5,547.00	.....	1,476.06	4,070.94	.....	26.61	73.39
Uncollectible Accounts.....	29,862.71	.....	7,946.47	21,916.24	.....	26.61	73.39
Administrative Expense.....	157,384.19	.....	41,879.93	115,504.26	.....	26.61	73.39
Fire Insurance.....	41,994.16	1,164.31	1,114.25	39,715.60	2.77	2.65	94.58
Casualty Insurance.....	18,339.32	474.57	4,937.52	12,927.23	.....	.....	.....
Automobile Insurance.....	5,467.77	.....	3,723.55	1,744.22	.....	68.10	31.90
Replacements, Obsolescence, etc.....	780,369.32	.....	.....	780,369.32	.....	.....	100.00
Sub Total, Excl. Taxes and Return	2,893,480.33	144,122.34	516,692.80	2,232,665.19	4.98	17.86	77.16
Total, Excluding Return.....	3,098,922.80	154,353.38	553,384.82	2,391,184.60	.....	.....	.....
Credit acct. Cost Gas delivered to Redwood District.....	71,728.02	.....	.....	71,728.02	.....	.....	100.00
Total Cost of Gas for S. F. Excl. Return	3,027,194.78	154,353.38	553,384.82	2,319,456.58	5.10	18.28	76.62
Total Sales to S. F. Dist. (Excl. St. lgtg. and Co. Use—1915-16)				4,683,697 M Cu. Ft.			
Average Number of Consumers 1915-16.....			112,338				
Cost per Consumer per Mo.—Excl. Return.....			\$.411				\$.495
" " M Cu. Ft. " " .....							.160
Return at 8%—Consumer & Output (forward from p. 13) .....			.370				\$.655
			\$.781				

Pacific Gas and Electric Company,

San Francisco District, Gas Department.

Analysis of Gas Costs, Detail of Consumer Costs, Year 1915-1916.

	Total consumer cost, year 1915-1916.	Cost per con- sumer per month.
Maintenance:		
Mains—Accts. 1502-1601-1604.....	\$14,997.27	\$.01112
Services, etc.—Acct. 1602-1606.....	59,804.38	.04436
Miscellaneous Maintenance	7,520.86	.00558
Total Maintenance.....	82,322.51	.06106
Distribution Expenses:		
Sets & Outs, etc.—Accts. 1900-1905.....	27,402.41	.02033
Complaints & Inspectors—Accts. 1901-2.....	39,574.39	.02936
Statements & Collectors—Accts. 1903-4.....	97,339.40	.07221
New Business Expense—Acct. 1911.....	7,388.55	.00548
Superintendence—Acct. 1912	6,286.60	.00466
Office Salaries & Exp's—Accts. 1913-14.....	169,181.91	.12550
General Expense—Accts. 1916-17-18.....	26,119.25	.01938
Total Distribution Expenses.....	373,292.51	.27692

Analysis of Gas Costs.—Continued.

General Expenses:

	Total consumer cost, year 1915-1916.	Cost per con- sumer per month.
Taxes	36,692.02	.02722
Floating Debt Interest, Uncollectible Accounts & Administrative Expense....	51,302.46	.03806
Insurance—Fire, Casualty & Auto.....	9,775.32	.00725
Total General Expenses.....	97,769.80	.07253
Total Cost, Exclusive of Return.....	\$553,384.82	\$.411
Return on Investment:	Ret. at 8%.	
Mains (2)-(3)-(4)	\$1,865,088.13	\$.11068
Services & Meters (5)-(6).....	3,267,816.95	.19393
Miscel. (9)-(10)-(11)-(12)-(13)-(17)-(18)-(19)-(21)- (22)	94,461.44	.00561
Head Office Bldg., etc.....	60,701.22	.00360
Warehouse Bldg. & M. & S. Adj.....	9,983.81	.00059
Additional Overhead.....	366,420.23	.02174
Total Return on Investment.....	5,664,471.78	.....
Add. & Bett. Adjusted, etc. 1915-16.....	260,362.30	.01545
Average Non-Landed Capital 1915-16.....	5,924,834.08	.....
Landed Capital 1915-16.....	88,800.95	.00527
Working Capital 1915-16.....	215,079.43	.01276
Total Return at 8%.....	\$6,228,714.46	.370
Total Consumer Cost per Month.....		\$.781

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PLAINTIFF'S EXHIBIT NO. 73, PAGE 9.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive.

Maintenance:

Maintenance of Generating Capital:

	Total.	Prorated to—		Per cent prorated to—	
		Street lighting.	Consumers.	Street lighting.	Consumers.
1400 Works & Station Structures.....	\$3,791.26	.....	.....	.....	.....
1401 General Structures.....	3,846.86	.....	.....	.....	.....
1402 Steam Producture & Accessories.....	12,630.08	.....	.....	.....	.....
1403 Gas Generators.....	10,307.29	.....	.....	.....	.....
1404 Water Gas Sets.....	783.00	.....	.....	.....	.....
1405 Steam & Gas Engines.....	107.39	.....	.....	.....	.....
1406 Purification Apparatus.....	5,738.61	.....	.....	.....	.....
1407 Holders.....	2,046.12	.....	.....	.....	.....
1408 Accessory Gas Plant Equipment.....	26,998.99	.....	.....	.....	.....
1409 Fuel Oil Tanks.....	324.87	.....	.....	.....	.....
1410 Station Pipe Lines.....	188.46	.....	.....	.....	.....
1411 Tools & Appliances.....	2,763.71	.....	.....	.....	.....
1413 Autos, Motorcycles & Bicycles.....	679.60	.....	.....	.....	.....
1414 Furniture & Fixtures.....	95.57	.....	.....	.....	.....
Total	70,364.81	1,913.92	.....	2.72	.....
					97.28

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive—Continued.

	Total.	Prorated to—		Per cent prorated to—		
		Street lighting.	Consumers.	Output.	Street lighting.	Cons. Output.
Maintenance of Transmission Capital cont'd :						
1500 General Structures.....	4.05	0.11	.....	3.94	2.72	97.28
1501 Boosting Apparatus.....	363.18	9.88	.....	353.30	2.72	97.28
1502 Trunk Lines.....	1,430.49	25.89	476.78	927.82	1.81	64.86
Total	1,797.72	35.88	476.78	1,285.06	2.00	71.48
Maintenance of Distribution Capital:						
1600 General Structures.....	830.37	33.30	459.11	337.96	4.01	55.29
1601 Mains	41,667.39	754.18	13,887.74	27,025.47	1.81	33.33
1602 Services	32,537.62	.....	32,537.62	.....	.....	100.00
1603a Mains.....	17.91*	17.91*	.....	.....	100.00	.....
1603b Services.....	.....	.....	.....	.....	.....	.....
1603c Street Light- ing.....	1,184.52	1,184.52	.....	.....	100.00	.....
1603d Stands & Brack- ets.....	1,003.34	1,003.34	.....	.....	100.00	.....
1604 Regulators	1,898.45	34.36	632.75	1,231.34	1.81	33.33
						64.86

[* In red in copy.]

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive.

(Cont'd.)

Maintenance of Distribution Capital (cont'd.):	Total.	Prorated to—		Per cent prorated to—		
		Street lighting.	Consumers.	Output.	Street lighting.	Cons. Output.
1605 Commercial Arc Lamps.....	\$7,719.83	.....	.....	.....	.....	.....
1606 Gas Meters.....	27,200.76	.....	\$27,206.76	.....	.....	100.00
1607 Tools & Appliances.....	198.96*	.....	110.00*	80.96*	4.01	55.29
1609 Autos, Motorcycles & Bicycles.....	9,332.37	.....	7,061.80	2,270.57	.....	75.67
1610 Furniture & Fixtures.....	198.85	7.97	109.95	80.93	4.01	55.29
Total, Excluding Acct. 1605.....	116,302.80	19,907	60,000	67,398.06	82,948.18	81,102.98
Total	124,022.63	3,591.78	81,845.73	30,805.29	.....	.....
Total Maintenance, Excluding Acct. 1605.....	188,405.33	5,541.58	82,322.51	100,601.24	2.94	43.68
Total Maintenance.....	196,185.16	5,541.58	82,322.51	100,601.24	.....	.....

[*In red in copy.]

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive—Continued.

	Total.	Prorated to—		Per cent prorated to—			
		Street lighting.	Consumers.	Output.	Street lighting.	Cons.	Output.
Operating Expenses:							
Generating Expenses:							
1700 Steam Plant.....	38,048.71	.....	.....	.....	.....	.....
1701 Generating Plant.....	48,734.23	.....	.....	.....	.....	.....
1702 Purification Apparatus.....	46,035.51	.....	.....	.....	.....	.....
1704 Fuel Oil for Gas.....	711,438.79	.....	.....	.....	.....	.....
1705 Lamplack Expense for Steam.....	36,113.47	.....	.....	.....	.....	.....
1706 Lamplack Expense for Gas.....	919.79	.....	.....	.....	.....	.....
1707 Lamplack Expense—Removing.....	14,395.73	.....	.....	.....	.....	.....
1708 General Labor & Supplies.....	63,633.29	.....	.....	.....	.....	.....
1709 Superintendence	9,121.62	.....	.....	.....	.....	.....
1710 Office Salaries.....	9,893.29	.....	.....	.....	.....	.....
1711 Office Expense.....	1,977.86	.....	.....	.....	.....	.....
1713 Auto Expense.....	2,894.90	.....	.....	.....	.....	.....
1714 Sundry Expenses.....	887.70	.....	.....	.....	.....	.....
Cost of Electricity.....	41,351.39	.....	.....	.....	.....	.....
Total	1,025,416.19	27,892.14	.....	997,554.05	2.72	97.28
Transmission Expenses:							
1800 Boosting Apparatus.....	9,796.04	.....	.....	.....	.....	.....
1802 General Labor and Supplies.....	5,407.68	.....	.....	.....	.....	.....
1808 Sundry Expense.....	12.00	.....	.....	.....	.....	.....
Cost of Electricity.....	35,254.29	.....	.....	.....	.....	.....
Total	50,470.01	1,372.78	.....	49,097.23	2.72	97.28

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive.

(Cont'd.)

Distribution Expenses:	Total.	Prorated to—		Per cent prorated to—		
		Street lighting.	Consumers.	Output.	Street lighting.	Cons.	Output.
1900 Sets & Outs.....	\$27,382.69	.....	\$27,382.69	.....	100.00	.....
1901 Complaints.....	33,779.54	.....	33,779.54	.....	100.00	.....
1902 Inspectors.....	5,794.85	.....	5,794.85	.....	100.00	.....
1903 Statements.....	20,089.11	.....	20,089.11	.....	100.00	.....
1904 Collectors.....	77,250.29	.....	77,250.29	.....	100.00	.....
1905 Setting & Removing Regulators...	19.72	.....	19.72	.....	100.00	.....
1906 Municipal St. Lighting Expense...	95,450.94	95,450.94	.....	.....	.....	.....
1907 Trimming Commercial Arc Lamps.	28,584.43	.....	.....	.....	.....	.....
1908 Gratuitous Service.....	1,723.06	.....	.....	1,723.06	.....	.....
1910 Donations.....	966.70	.....	.....	966.70	.....	100.00
1911 New Business Expense.....	39,723.39	.....	.....	32,334.84	.....	100.00
1912 Superintendence.....	6,286.60	528.70	7,388.55	4,686.66	8.41	17.04
1913 Office Salaries.....	170,084.73	6,000.00	142,920.73	21,164.00	3.53	84.03
1914 Office Expense.....	37,458.69	1,322.29	31,476.54	4,659.86	3.53	84.03
1916 Auto Expense.....	22,101.62	.....	17,254.73	4,846.89	.....	78.07
1917 General Labor & Supplies.....	43,136.90	3,627.81	7,350.53	32,158.56	8.41	17.04
1918 Sundry Expense.....	8,884.90	747.22	1,513.99	6,623.69	8.41	17.04
Total—Excluding Acct. 1907	590,134.33	107,676.96	373,292.51	109,164.86	18.25	63.25
Total.....	618,718.76	107,676.96	373,292.51	109,164.86	.....	.....
Total Operating Expenses—						
Excluding Acct. 1907....	1,666,050.53	136,941.88	373,292.51	1,155,816.14	8.22	22.41
Total Operating Expenses..	1,694,634.96	136,941.88	373,292.51	1,155,816.14

Analysis of Costs for Year of July 1, 1915, to June 30, 1916, Inclusive—Continued.

Distribution Expenses:	Total.	Prorated to—		Per cent prorated to—		
		Street lighting.	Consumers.	Street lighting.	Cons.	Output.
Total Maintenance & Operating Expenses—Excl. Accts. 1905, 1907, 1911, 1912, 1913, 1914, 1917, & 1918.....	1,548,940.65	130,257.44	263,893.44	1,154,789.77	8.41	74.55
Total Maintenance & Operating Expenses—Excl. Accts. 1905 & 1907....	1,854,515.86	142,483.46	455,615.02	1,256,417.38	7.68	67.75
Total Maintenance & Operating Expenses	1,890,820.12	142,483.46	455,615.02	1,256,417.38	.....	.....

Pacific Gas and Electric Company.

San Francisco District, Gas Department.

Analysis of Gas Costs Year 1915-1916.

Summary of Apportionment of Capital.

	Total capital average for year 1915-1916.	Per cent prorated to—			Valuation prorated to—		
		Street lighting.	Consumer.	Output.	Street lighting.	Consumer.	Output.
Average Non-Landed Capital Exclusive of Working Capital, Franchises and Going Concern	\$14,256,399.20	3.75	41.56	54.69	\$534,486.98	\$5,924,834.08	\$7,797,078.14
Landed Capital	919,568.71	2.83	9.65	87.52	26,040.50	88,800.95	804,727.20
Working Capital from Exhibit 36, and Prorated on basis of Total Costs, Ex- clusive of Return	1,176,583.30	5.10	18.28	76.62	60,005.75	215,079.43	901,498.12
Total Average Capital Exclusive of Franchises and Going Concern	16,352,551.21	3.79	38.09	58.12	620,533.23	6,228,714.46	9,503,303.52
Deduct—Gas Arcs	142,982.66	....	....	....	.....	.....	142,982.66
Total	16,209,568.55	....	....	....	.....	.....	9,360,320.86
Return on Capital at 8%	1,296,765.49	3.79	38.09	58.12	49,642.66	498,297.16	748,825.67

4,683,697 M Cu. Ft.

Total Sales to S. F. Dist. (Excl. Street Ltg. & Co. Use—1915-1916)

Average Number of Consumers

Return on Capital at 8% per consumer per month

Per M Cu. Ft. of Gas Delivered

\$12.338

\$.370

\$.160

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PLAINTIFF'S EXHIBIT No. 73, PAGE 13.

Pacific Gas and Electric Company. San Francisco District, Gas Department.

Analysis of Gas Costs Year 1915-1916.

Apportionment of Non-landed Capital.

E. C. Jones' Per cent of valuation prorated
valuation of
June 30, 1914, {
including total Street lighting. Consumer. Output.
overhead.

Valuation prorated to—

Street lighting. Consumer. Output.

Plants:

Potrero Station \$1,810,943.52
Independent Station..... 492,476.36
Metropolitan Station 564,568.03
Martin Station 472,725.77
North Beach Station..... 273,884.71

Total Plants \$3,614,598.39

2.72

.....

97.28

\$98,317.08

\$3,516,281.31

Distribution:

(2) Gas Mains, Low Pressure.....
(3) Gas Mains, High Pressure.....
(4) Valve Pits and Governor Pits...
(5) Services
(6) Meters
(7) Street Lamp Posts and Services.
(8) Gas Arcs (Excl. before comput.
return)
(9) Tools and Appliances.....
(10) Furniture and Fixtures.....

5,142,242.19 1.81
419,553.37 1.81
34,028.39 1.81
2,344,853.15
922,963.80
271,411.40 100.00

33.33
33.33
33.33
100.00
100.00
.....

93,074.58
7,583.92
615.91
.....
.....
271,411.40

1,713,909.33
139,837.14
11,341.66
2,344,853.15
922,963.80
.....

3,335,258.28
272,122.31
22,070.82
.....
.....
.....

100.00
40.70
40.70

.....
576.13
149.35

7,943.69
2,059.28

142,982.66
5,847.49
1,515.87

(11) Distribution Office	1,738.23	4.01	55.29	40.70	69.70	961.07	707.46
(12) Meter Repair Shop.....	3,315.69	....	100.00	....	....	3,315.69	....
(13) Steel Tubing in Stock.....	22,650.47	1.81	33.33	64.86	409.97	7,549.40	14,691.10
(14) Total Distr. Excl. Items (9, 10, & 11)	9,304,000.52	4.01	55.29	40.70	373,105.78	5,143,769.57	3,787,125.17
(15) Total Distribution	9,323,830.56	4.01	55.29	40.70	373,900.96	5,154,733.61	3,795,195.99
Miscellaneous:							
(16) Oil on Hand.....	24,215.75	2.72	....	97.28	658.67	....	23,557.08
(17) Tools and Appliances.....	11,748.00	3.63	39.88	56.49	426.45	4,635.10	6,636.45
(18) Material and Supplies.....	75,033.61	3.63	39.88	56.49	2,723.72	29,923.40	42,386.49
(19) Patterns	790.90	3.63	39.88	56.49	28.71	315.41	446.78
(20) Gas on Hand.....	2,575.70	2.72	....	97.28	70.06	....	2,505.64
(21) Garage and Repair Shop.....	13,002.86	....	68.10	31.90	....	8,854.95	4,147.91
(22) Automobiles	42,370.12	....	68.10	31.90	....	28,854.05	13,516.07
(23) Total Miscellaneous	169,736.94	....	....	....	3,907.61	72,632.91	93,196.42
(24) Total Excl. Items (17, 18, & 19)	13,020,593.38	3.63	39.88	56.49	472,946.77	5,192,442.61	7,355,204.00
(25) Total E. C. Jones' Val. of June 30, 1914.....	13,108,165.89	3.63	39.88	56.49	476,125.65	5,227,366.52	7,404,673.72

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PLAINTIFF'S EXHIBIT No. 73, PAGE 14.

Pacific Gas and Electric Company. San Francisco District, Gas Department.

Analysis of Gas Costs Year 1915-1916.

Apportionment of Non-landed Capital.

	Valuation.	Per cent of valuation prorated to—			Valuation prorated to—		
		Street lighting.	Consumer.	Output.	Street lighting.	Consumer.	Output.
Total E. C. Jones' Valuation of June 30, 1914	\$13,108,165.89	3.63	39.98	56.49	\$476,125.65	\$5,227,366.52	\$7,404,673.72
Deduct Adjustments:							
As per agreement.....	37,464.34	2.72	.....	97.28	1,019.63	.....	36,445.31
" "	4,500.00	2.72	.....	97.28	122.40	.....	4,377.60
Leveling Site at Potrero.....	109,802.00	2.72	.....	97.28	2,986.61	.....	106,815.39
Total Deductions	151,766.34	2.72	.....	97.28	4,128.04	.....	147,638.30
E. C. Jones' Valuation of June 30, 1914 (Adjusted)	12,956,399.55	.....	.....	.....	471,997.61	5,227,366.52	7,257,035.42
Deduct Items not Carrying Overhead..	224,064.54	.....	.....	.....	5,759.07	81,014.92	137,290.55
Add—Additional Overhead 7.12%.....	12,732,335.01	.....	.....	.....	466,238.54	5,146,351.60	7,119,744.87
Add—Items Not Carrying Overhead..	906,542.25	.....	.....	.....	33,196.18	366,420.23	506,925.84
E. C. Jones' Valuation of June 30, 1914, Incl. Total Overhead.....	13,862,941.80	3.64	40.35	56.01	565,193.79	5,593,786.75	7,763,961.26

Add Items Not Included in E. C. Jones' Valuation:

Head Office Building—Pro rata.....	68,107.92	3.64	40.35	56.01	2,479.13	27,481.54	38,147.25
Furniture & Fixtures— "	62,534.15	3.64	40.35	56.01	2,276.24	25,232.53	35,025.38
Stationery Stock "	7,987.15	....	100.00	....	.....	7,987.15	.....
Adjustment, Material, & Supplies....	5,749.66	3.63	39.88	56.49	208.71	2,292.97	3,247.98
Pro rata of Warehouse Buildings at 5th & Tehama Sts.....	13,910.00	4.01	55.29	40.70	557.79	7,630.84	5,661.37
Total Value Gas Dept. Non-Lauded Capital as of June 30, 1914 (Exclusive of Working Capital, Franchises, and Going Concern)	\$14,021,230.68	3.64	40.40	55.96	\$510,715.66	\$5,664,471.78	\$7,846,043.24

Pacific Gas and Electric Company. San Francisco District, Gas Department.

Analysis of Gas Costs Year 1915-1916.

Apportionment of Non-landed Capital.

	Per cent of valuation prorated to—				Valuation prorated to—		
	Valuation.	Street lighting.	Consumer.	Output.	Street lighting.	Consumer.	Output.
Total Value Gas Dept. Non-Landed Capital as of June 30, 1914 (exclusive of Working Capital, Franchises and Going Concern)	\$14,021,230.68	3.64	40.40	55.96	\$510,715.66	\$5,664,471.78	\$7,846,043.24
Adjusted Net A. & B. Gas Dept. Non-Landed Capital for year ending June 30, 1915	267,469.08	10.46	61.90	27.64	27,980.75	165,569.70	73,918.63
Net A. & B. All Dept. Non-Landed Capital, S. F. District, year ending June 30, 1915 (Pro rata)	671.85	3.64	40.40	55.96	24.46	271.43	375.96
Total Value Gas Dept. Non-Landed Capital as of June 30, 1915 (exclusive of Working Capital, Franchises, and Going Concern)	14,289,371.61	3.77	40.80	55.43	538,720.87	5,830,312.91	7,920,337.83
Deduct—Martin Station	506,383.84	2.72	.....	97.28	13,773.64	.....	492,610.20
Add—New Sets at Potrero	241,812.59	2.72	.....	97.28	6,577.30	.....	235,235.29
Net Deduction	264,571.25	2.72	.....	97.28	7,196.34	.....	257,374.91
Adjusted Valuation at beginning of Year 1915-1916	14,024,800.36	3.79	41.57	54.64	531,524.53	5,830,312.91	7,662,962.92

Adjusted Net A. & B. Gas Dept. Non-Landed Capital for year ending June 30, 1916	389,840.04	0.81	40.67	58.52	3,144.65	158,547.57	228,147.82
Net A. & B. All Dept. Non-Landed Capital, S. F. District, year ending June 30, 1916 (Pro rata)	1,025.88*	3.79	41.57	54.64	61.62*	675.88*	888.38
Net A. & B. All Dept. Non-Landed Capital, Head Office, year ending June 30, 1916 (Pro rata)	74,983.52	3.79	41.57	54.64	2,841.88	31,170.64	40,971.00
Total Value Gas Dept. Non-Landed Capital as of June 30, 1916 (exclusive of Working Capital, Franchises, and Going Concern)	14,487,998.04	3.71	41.55	54.74	537,449.44	6,019,355.24	7,931,193.36
Average Value Gas Dept. Non-Landed Capital for year ending June 30, 1916 (exclusive of Working Capital, Franchises, and Going Concern)	14,256,399.20	3.75	41.56	54.69	534,486.98	5,924,834.08	7,797,078.14

*[In red in copy.]

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PLAINTIFF'S EXHIBIT No. 73, PAGE 16.

Pacific Gas and Electric Company, San Francisco District, Gas Department

Analysis of Gas Costs Year 1915-1916.

Apportionment of Landed Capital.

	Landed capital charged to gas department.	Per cent prorated to—			Valuation prorated to—		
		Street lighting.	Consumers.	Output.	Street lighting.	Consumers.	Output.
Gas Plant Sites:							
Parcels Nos. 1 to 9 (Exhibit 1)	\$733,779.50						
Parcel No. 10 (Exhibit 2)	11,440.57						
	<u>\$745,220.07</u>	2.72	.....	97.28	\$20,269.00	.....	\$724,950.08
Warehouse and Storage Yard:							
Parcels Nos. 11 & 12 (Exhibit 2)	79,174.01	4.01	55.29	40.70	3,174.93	43,775.30	32,223.85
Garage and Machine Shop Site:							
Parcels Nos. 13, 14 and 15 (Exhibit 2)	23,865.48	....	68.10	31.90	.....	16,232.40	7,613.08
Office Building Site:							
Parcel No. 16 (Exhibit 2)	71,309.15	3.64	40.35	56.01	2,595.65	28,773.25	39,940.25
Totals	<u>\$919,568.71</u>	2.83	9.65	87.52	<u>\$26,040.50</u>	<u>\$88,840.95</u>	<u>\$804,727.26</u>

Pacific Gas and Electric Company.

San Francisco District, Gas Department.

*Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.***Capital.****Generating Capital:**

Prorated on Basis of Gas Accounted for 1915-1916.

Total Sales to S. F. Consumers, Street Lighting, Redwood District Consumers, and used by Gas Dept.

Total 5,056,164.7 M Cu. Ft.

Sold for Street Lighting.. 137,458. " "

2.72 of Total..... 2.72

Distribution Capital:

Gas Mains—Low Pressure—

Charge to consumers (arbitrary) 33.33%.

Prorate balance on basis of Gas Accounted for to—

Street Lighting— $2.72\% \times 66.77 = 1.81\%$ Output — $97.28\% \times 66.67 = 64.86$

Gas Mains—High Pressure—same as above.....

Valve Pits & Governors " " ".....

Per cent prorated to—		
Street lighting.	Consumer.	Output.

.....

97.28

33.33

64.86

33.33

64.86

33.33

64.86

1.81

1.81

1.81

San Francisco District, Gas Department.

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.

	Per cent prorated to—	
	Street lighting.	Consumer.
Miscellaneous Capital (continued):		
Acct. 1413—Maintenance.....	\$1,448.40	
“ 1609—“.....	14,347.39	
“ 1713—Generating Expense.....	3,020.51	
“ 1916—“.....	19,223.74	
Total	<u>\$38,040.04</u>	
A careful analysis of accounts 1609 and 1916 showed the following amounts chargeable to consumer:		
Maintenance	\$10,857.24	
Operating Expense	15,008.28	
	<u>\$25,865.28</u>	
\$25,865.28 ÷ \$38,040.04 = 68.10% chargeable to consumer. As only a very small proportion of the above amount is chargeable to Street Lighting, the balance, or 31.90%, is charged entirely to Output		
	68.10	31.90

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl.—Continued.

	Per cent prorated to—		
	Street lighting.	Consumer.	Output.
Automobile—same as above.....	.....	68.10	31.90
Total E. C. Jones' Valuation of June 30, 1914—Average Segregation.	3.63	39.88	56.49
Adjustments—deductions—same basis as Gas Generating Capital....	2.72	.....	97.28
Total—E. C. Jones' Valuation of June 30, 1914, including Total Overhead—Average Segregation.....	3.64	40.35	56.01
Items not included in E. C. Jones' Valuation:			
Head Office Building—basis of total E. C. Jones' Valuation June 30, 1914, including Overhead.....	3.64	40.35	56.01
Furniture & Fixtures—same as above.....	3.64	40.35	56.01
Stationary Stock—entirely to consumer.....	.....	100.00	.....
Adjustment—Materials & Supplies—on basis of direct segregation of Generating, Distribution and Miscellaneous Capital.....	3.63	39.88	56.49
Prorata of Warehouse Building, 5th & Tehama Streets—on basis of Total Distribution Capital—average.....	4.01	55.29	40.70
Total Value Gas Dept. Non-Landed Capital as of June 30, 1914 (exclusive of Working Capital, Franchises and Going Concern) average	3.64	40.40	55.96
Adjusted Net A. & B. Gas Dept. Non-Landed Capital for year ending June 30, 1915, segregated on basis of percentage derived by prorating each item in accordance with methods and percentages established above.....	10.46	61.90	27.64

San Francisco District, Gas Department.

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.

	Per cent prorated to—		
	Street lighting.	Consumer.	Output.
Miscellaneous Capital (cont'd):			
Net A. & B. all Dept. Non-Landed Capital S. F. District year ending June 30, 1915 (prorata) segregated on basis of Total Valuation	3.64	40.40	55.96
Capital as of June 30, 1915 (exclusive of Working Capital, Franchises and Going Concern)—average.....	3.77	40.80	55.43
Deduct—Martin Station—basis of Gas Generating Capital.....	2.72	.....	97.28
Add—New Sets—Potrero—basis of Gas Generating Capital.....	2.72	.....	97.28
	<hr/>	<hr/>	<hr/>
Adjusted Valuation—beginning year 1915-1916—Avg.....	3.79	41.57	54.64
Adjusted A. & B. Gas Dept. Non-Landed Capital for year ending June 30, 1916, segregated on basis of percentage derived by prorating each item in accordance with methods and percentages established above.....	0.81	40.67	58.52
Net A. & B. All Depts.—Non-Landed Capital S. F. District year ending June 30, 1916 (Prorata), segregated on basis of average Total Valuation at beginning of year.....	3.79	41.57	54.64
Net A. & B. All Depts. Non-Landed Capital, Head Office, year ending June 30, 1916 (Prorata)—same as above.....	3.79	41.57	54.64
	<hr/>	<hr/>	<hr/>
Total Balance Gas Dept. Non-Landed Capital, as of June 30, 1916 (exclusive of Working Capital, Franchises and Going Concern)—Average Segregation.....	3.71	41.55	54.74

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl.—Continued.

	Per cent prorated to—		
	Street lighting.	Consumer.	Output.
Miscellaneous Capital (cont'd):			
Average Value Gas Dept. Non-Landed Capital, year ending June 30, 1916 (exclusive of Working Capital, Franchises and Going Concern)—Average Segregation.....	3.75	41.56	54.69
Landed Capital:			
Gas Plant Sites—on basis of Gas Generating Capital.....	2.72	.....	97.28
Warehouse & Storage Yard—on basis of average Distribution Capital segregation	4.01	55.29	40.70
Garage & Machine Shop Site—same basis as Garage & Machine Shop.	.....	68.10	31.90
Office Building Site—on same basis as Office Building.....	3.64	40.35	56.01
Total Landed Capital—Average Segregation.....	2.83	9.65	87.52

San Francisco District, Gas Department.

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.

	Per cent prorated to—		
	Street lighting.	Consumer.	Output.
Maintenance:			
Maintenance of Generating Capital:			
Total—same as Gas Generating Capital.....	2.72	.....	97.28
Maintenance of Transmission Capital:			
1500—General Structures—same as Gas Gen'g Capital.....	2.72	.....	97.28
1501—Boosting Apparatus—“ “ Gen'g “.....	2.72	.....	97.28
1502—Trunk Lines — “ “ Mains Capital.....	1.81	33.33	64.86
Maintenance of Distribution Capital:			
1601—Mains—same as Mains Capital.....	1.81	33.33	64.86
1602—Services—Entirely to consumer.....	.....	100.00	.....
1603a—Mains.....	Mun. Street (entirely )	.....	.....
1603b—Services.....	Lighting (to )	.....	.....
1603d—Stands & Brackets.....	System (Street Lighting )	.....	.....
1604—Regulators—same as Mains Capital.....	1.81	33.33	64.86
1605—Commercial Arc Lamps—(omitted).....	.....	.....	.....
1606—Gas Meters—entirely to consumer.....	.....	100.00	.....
1607—Tools & Appliances—same basis as average Distribution Capital	4.01	55.29	40.70

1907—Trimming Commercial Arc Lamps—(Omitted) .....	.....	.....	.....
1908—Gratuitous Services—entirely to output .....	.....	.....	100.00
1910—Donations — “ .....	.....	.....	100.00
1911—New Business Expenses—Prorated between consumer and Output on Overhead basis as follows:			
Consumer	\$263,893.44—	18.60%	
Output	1,154,789.77—	81.40%	
	<hr/>		
	\$1,418,683.21—	100.00%	
		18.60	81.40

PLAINTIFF'S EXHIBIT No. 73, PAGE 21.

San Francisco District, Gas Department.

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.

	Per cent prorated to—	
	Street lighting.	Consumer.
	8.41	17.04
		74.55

Distribution Expenses (Cont'd) :

1912—Superintendence—segregated on basis of total Maintenance and Operating Expenses (excluding Accounts 1605-1907-1911-1912-1913-1914-1917 and 1918.....

1913—Office Salaries—segregated on basis of an analysis made of this account for the years 1915 and 1916.

Auditing and District Mgr. amounts to about \$32,000 per year. Of this amount \$6,000 is first charged to Street Lighting, balance segregated between consumer and output on basis derived above for Account No. 1911.

Balance of Account 1913, consisting of Bookkeeping and Addressographs, Records, Counter Men and General Labor, and Gas Distribution Dept. Office, charged to consumer.

San Francisco District, Gas Department.

Analysis of Costs for Year July 1, 1915, to June 30, 1916, Incl., Basis of Segregation.

Summary of Costs:

Taxes—on basis of percentages in "Sub-total Exclusive of Taxes and Return"
 Floating Debt Interest.....)
 Uncollectible Accounts.....) to consumer
 Administrative Expense.....)

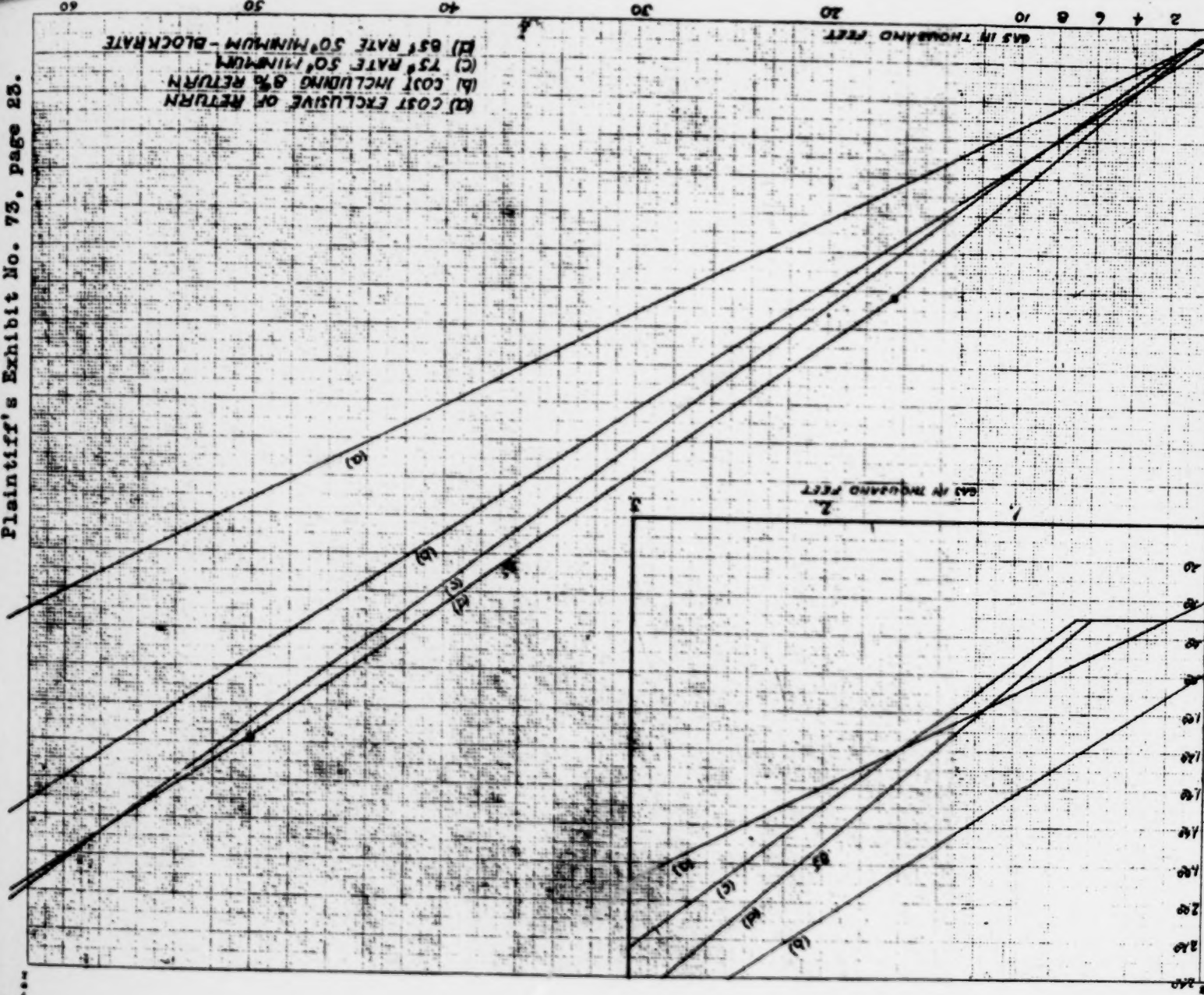
and Output on basis of ratio of total Consumer and Output Costs, Maintenance and Operation as follows:

Consumer Costs	\$455,615.02—	26.61%
Output	1,256,417.38—	73.39%
	<hr/>	
	\$1,712,032.40	100.00%.....

Fire Insurance—on basis of a segregation of each item of insurable property, in accordance with the previously determined percentages of proration for same.....

Casualty Insurance—A careful analysis was made of the expenditures for Maintenance and Operating Labor for period July 1, 1915 to June 30, 1916, inclusive, segregating each item to Plant Labor or Office Labor, according to use, and segregating these also in turn to Street Lighting, Consumer and Output on bases established for corresponding Maintenance and Operating Expenses.

Per cent prorated to—		
Street lighting.	Consumer.	Output.
4.98	17.86	77.16
	26.61	73.39
2.77	2.65	94.58



By W.G.V.A.
 Tr by L.E.D.
 DATE 7/25/17
 SCALE
 O.K.

ANALYSIS OF GAS COSTS

JAN FRANCISCO YEAR 1915-1916

PACIFIC GAS AND ELECTRIC COMPANY, SAN FRANCISCO, CAL.

CORRECTION

Automobile Insurance—on basis of Automobiles, etc. Capital.....	68.10	31.90
Replacements, Obsolescence, etc.—The amount allowed for Replacements, Obsolescence, etc. was taken from Company's Exhibit # — and has been charged entirely to Output, although it is recognized that a portion is property chargeable to Street Lighting and Consumer. This was done inasmuch as there was no segregation available upon which to prorate to the different classes.	.....	100.00
Credit Account Cost of Gas delivered to Redwood District: This amount represents the estimate of the proportions of the Production Costs chargeable to Redwood District, and has been entirely credited to Output.....	.....	100.00

(Here follows chart marked page 1737.)

1738 PLAINTIFF'S EXHIBIT NO. 73, PAGE 24.

Pacific Gas and Electric Company, San Francisco District, Gas
Department.

*Return from Consumers Using Not Less Than 50,000 Cu. Ft. per
Month, year 1915-1916 (City and County of San Francisco and
Exposition Excluded).*

(From Exhibit 50, p. 14.)

Gas Sold to Consumers using over 50,000 Cu. Ft. per month	489,968.4	M Cu. Ft.	
Revenue Received			\$337,407.78
Cost of Service Exclusive of Return:			
5,281 Consumer-months @ \$.411.....			\$2,170.49
489,968.4 M Cu. Ft. @ .495.....			242,534.36
			<hr/>
Total Cost of Service, Exclusive of Return....			\$244,704.85
Cost of Service Including 8% Return:			
5,281 Consumer-months @ \$.781.....			\$4,124.46
489,968.4 M Cu. Ft. @ .655.....			320,929.30
			<hr/>
Total Cost of Service, Including Return.....			\$325,053.76

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PLAINTIFF'S EXHIBIT NO. 73, PAGE 25.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Gas Costs.

Average Number of Consumers Using Different Quantities of Gas per Month for 12 months, September, 1913, to August, 1914, Inclusive (See p. 6, Exhibit 69).

Cu. ft. per month.	Average No. consumers.	Consumers using less than each quantity.	
		Number.	% total.
0	1,803	1,803	1.74
100	135	1,938	1.86
200	2,195	4,133	3.97
300	202	4,335	4.18
400	3,008	7,343	7.08
500	196	7,539	7.25
600	4,155	11,694	11.23
700	194	11,888	11.4
800	5,075	16,963	16.3
900	177	17,140	16.5
1,000	5,899	23,039	22.2
1,100	170	23,209	23.3
1,200	6,188	29,397	28.2
1,300	153	29,550	28.6
1,400	6,223	35,773	34.4
1,500	145	35,918	34.6
1,600	6,121	42,039	40.5
1,700	129	42,168	40.6
1,800	5,840	48,008	46.2
1,900	119	48,127	46.5
2,000	5,530	53,657	51.6
2,100	101	53,758	51.8
2,200	4,958	58,716	56.6
2,300	90	58,806	56.8
2,400	4,402	63,208	60.6
2,500	79	63,287	60.7
2,600	3,909	67,196	64.5
2,700	76	67,272	64.7
2,800	3,391	70,663	68.
2,900	59	70,722	68.1
3,000	2,991	73,713	70.8
Over 3,000	30,251		
Total.....		103,964	100%

1740 The witness explained the foregoing tabulated statements and chart as follows:

In general there are two distinct divisions of the gas business in San Francisco; first, the supplying of the street lighting service, and second, the supplying of the general consumers. The general consumers might well be divided into industrial consumers, residential consumers and commercial consumers, but in this study we have, of necessity, grouped them all together in one class. I have separated out the street lighting by itself and then divided the other costs between consumer costs and output costs.

Sheet No. 7 gives a summary of all the costs and the developed unit costs per consumer per month and per thousand feet of gas supplied.

Sheet No. 8 gives the details of the consumer costs.

Sheets 9, 10 and 11 deal with the analysis of the maintenance and operating expenses, showing the total expenses, the part of the total pro-rated to street lighting, to consumer and to output respectively, both in total dollars and in percentages.

Sheets 12, 13, 14, 15 and 16 deal with the segregation of capital.

The segregation of the return on capital is covered on sheet 12.

1741 Sheets 17 to 22 include notes indicating the method of pro-rating the various items on the previous sheets more fully than it was possible to explain on each sheet.

The next sheet is a blueprint which indicates the costs under the condition assumed, the 75 cent rate and the 85 cent block rate.

Sheet 24 is based on the information contained on page 14 of plaintiff's Exhibit No. 50 as to the number of consumers using over 50,000 cubic feet of gas and the revenue received from them, and indicates the cost of serving them estimated both with and without the return on the investment.

Sheet 25 is a further analysis of the information contained on page 6 of Exhibit No. 69.

To indicate the method employed in making this analysis, beginning on page 9, Maintenance of Generating Capital is the first item to be considered. Taking the demand and the output together under the general heading of Output Costs, the question of dividing the plant and all expenses to the plant is one simply of pro-rating between street lighting and the other consumers' expenses on the basis of the gas sold to each class. 2.72% of the total sales in San Francisco are for street lighting. That percentage of the maintenance of the plant was charged against street lighting, the balance was thrown into the output column.

1742 The next item under "Maintenance" carried two items which are pro-rated on this basis, namely, General Structures and the Boosting Apparatus.

The item "trunk lines" is a part of the street mains system and is pro-rated on the basis of the street mains. I have pro-rated one-third of the street mains system and all expenses incidental thereto against consumer costs, and the other two-thirds between street lighting costs and output costs on the basis of gas sold in each case. These expenses of 1.81% to street lighting, 33.33% to consumer

and 64.86% to output will be found in several places wherever it is necessary to apportion the expenses incidental to the street mains.

Maintenance of distribution capital:

Mains are apportioned as indicated above. The items of Street Mains, Services, Stands and Brackets used in connection with municipal street lighting were all thrown 100 per cent to the street lighting costs. The District Regulators were treated the same way as street mains. The maintenance of commercial arc lamps has been omitted entirely from each of the three columns. Gas meters were thrown 100 per cent. into the consumer column. The items of Tools and Appliances, Furniture and Fixtures and the first item under the group of Maintenance of General Structures were 1743 apportioned in proportion to the direct segregation of the other items under Distribution of Maintenance. Those are more or less similar items and have been apportioned as an overhead of other maintenance accounts.

Automobiles, motorcycles and bicycle expense-maintenance was apportioned after making a very careful analysis of the use of the automobile in San Francisco, and of the maintenance and operating expense of the machines, and apportioned directly between consumer and output, based on the use made of the automobiles.

Operating Expenses:

Generating Expenses were apportioned on the basis of gas sold to street lighting and other consumers in the same manner as indicated in maintenance of generating capital. The Transmission Expenses were also apportioned on this same basis.

On page 11, the first 6 items under Distribution Expenses naturally fall directly into consumer costs. These items include the setting and removing of meters, the handling of complaints, the cost of inspectors whose duty it is to inspect the installation and statement takers who read meters; the expense of collecting money due from consumers and the setting and removing of regulators.

The next item, Municipal Street Lighting Expense, is charged 100 per cent to street lighting.

1744 The items of Gratuitous Service and Donations, while properly chargeable in part to consumers, as they are small I have thrown them entirely into the output column.

New Business Expense has been pro-rated between consumer and output costs as an overhead basis. This probably throws a little more into the output cost than should go there, but I have tried throughout this analysis to favor consumer cost.

Superintendence, office salaries and office expense were divided as an overhead charge on the basis of the cost directly assigned; by that I mean that there were certain accounts which I could not directly segregate, like Superintendence; I added up the accounts that I could segregate and found what proportion the sum of these was of the total expense, and then distributed the cost of superintendence and other accounts that I could not directly segregate on that ratio.

On that basis office salaries should be apportioned as follows: To consumer costs, approximately \$142,000.00, and to output cost, approximately \$21,000.00. On page 21 you will find some further detail of office salary expense. The office salaries were segregated on the basis of the analysis made of this account for the year 1915-16. By analyzing that account we found that the auditor and district manager expense amounted to about \$32,000.00 per year; of this amount \$6,000.00 is charged to street lighting as a purely arbitrary distribution, and the balance is segregated between consumer and output costs on the same basis as New Business

1745 Expenses were prorated on page 20 for account No. 1911 above. The balance of account No. 1913, consisting of Book-keeping and Addressographs, Records, Counter-men and General Labor items and Gas Distribution Department, was charged entirely to consumer cost.

The next item, Auto Expense, was segregated on the basis of the analysis for the maintenance of the actual automobiles used by the company in San Francisco in the year 1914, and I have taken the same ratio as applicable to this year.

The other items, General Labor, Supplies and Sundry Expenses, have been distributed as an overhead. The balance of that sheet simply consists of reconciling and totaling the items included and eliminating certain accounts which have been excluded, such as accounts having to do with commercial arc lamps.

The next sheet summarizes the apportionment of capital.

On sheet 13 the first group of items under Capital is Plants. That has been pro-rated on the same basis as expenses of plants. The items of Gas Mains, Valve Pits and Governor Pits have been pro-rated on the same basis as the Maintenance of Mains. The item of Services has been put entirely to consumer costs, 100 per cent. The item of Commercial Gas Arcs is included in the output column through an error, but is later deducted.

1746 Item 9, Tools and Appliances, covers distribution tools and appliances, which will be found in detail in Mr. Jones' valuation. That item has been prorated on the basis of other Distribution Capital.

Meter Repair Shop is charged 100% to consumers.

Steel Tubing in Stock is prorated on the same basis as Street Mains.

Miscellaneous:

The item Oil on Hand is prorated on the same basis as Plant Capital.

Items 17, 18 and 19, which are prorated on the basis of 3.63% to Street Lighting, are prorated by determining the average distribution of all capital, as indicated on the bottom line, and then prorating these items as general items. Item 17 covers general Tools and Appliances applicable to the company in general.

Gas on Hand is prorated on the same basis as Gas Plants.

Garage and Repair Shop is prorated on the same basis as Auto-

mobiles, which are prorated on the basis of actual use as determined by the analysis referred to.

Sheet 14 covers deductions to be made from E. C. Jones' valuation to bring it down to June 30, 1914, and to include additional 1747 overhead and other items not included by Mr. Jones, such as Head Office Building, Furniture and Fixtures.

Sheet 15 consists of adding Additions and Betterments to June 30, 1916. The last line of Sheet 15 gives the value of non-landed capital exclusive of working capital, franchise and going concern for the year ending June 30, 1916, and is carried forward to the first line in sheet 12.

Landed Capital summarized, in the second line on Sheet 12, is given in detail on Sheet 16.

The next item on Sheet 12 is Working Capital, which is taken from Exhibit No. 36 for the years in question and prorated on the basis of total cost exclusive of return.

The items of Capital are then summarized and Gas Arcs deducted. The Return based on 8% is then computed. The Total Returns Chargeable against Consumer's Cost is divided by the average number of consumers during the twelve-month period, and the quotient thus obtained divided by 12 gives us a result of 37¢ per consumer per month for the proper return on capital at 8% to go into the consumer cost column. The Return on Capital Charged against Output is divided by Total Sales to San Francisco District, exclusive of street light sales, with the resulting figure of 16¢ for return to go into the Output column.

The Output column is larger than the Consumer column, but you have 4,000,000,000 odd feet to divide by in one case and 112,000 odd consumers in the other. These items of 37¢ consumer cost and 16¢ output cost are carried forward to Sheet 7.

1748 On Sheet 7 the item Taxes has been apportioned on the basis of total cost exclusive of taxes; in other words, we left taxes for the last item and then determined the proration of that on the basis of the sum of all other costs.

The items of Floating Debt Interest, Uncollectible Accounts and Administrative Expenses are charged against consumer and output cost entirely on the basis indicated on page 22; that is, at the ratio of the total consumer and output cost, maintenance and operation as shown.

No Administrative Expense is charged to Street Lighting here.

You will notice in Account No. 1913, Office Salaries on page 11, I have charged \$6,000.00 against the Street Lighting account, which was an arbitrary apportionment that I estimated was sufficient to take care of any part of the administrative expense which would go into street lighting; in other words, the Floating Debt Interest, Uncollectible Accounts and Administrative Expenses have been divided by the total of Maintenance and Operating Expenses as given just above on page 7, it being found that the Consumer Cost, for instance, of approximately \$455,000.00, was 26.61% of the sum of the Consumer Cost and the Output Cost. On that basis, 26.61% of the items of Floating Debt Interest, Uncollectible Accounts and Ad-

ministrative Expenses was charged to consumer expense, the balance to Output.

The items Fire Insurance, Casualty Insurance and Automobile Insurance have been pro rated directly on the basis of the distribution already made on the property on which the insurance carried is charged, or on the basis of the payrolls as already distributed.

1749 The next item, "Replacements, Obsolescence, etc.," is taken from Exhibit No. 72 presented by Mr. Bridges, the company's auditor. This item has been charged entirely to Output cost, for the reason that there was no segregation of it available.

The amount taken in as a credit to the Redwood district is taken from Exhibit No. 45.

The final total, exclusive of Return, is then reduced to unit Consumer Cost and unit Output Cost, giving a total for Consumer Cost, including the 8% return on capital, of 78.1¢ per consumer per month, and 65.5¢ per thousand cubic feet of gas. The totals, without including any return, are 41.1¢ per consumer per month and 49½¢ per thousand cubic feet of gas. That is, the total of supplying a consumer who uses 1,000 feet of gas would be, without any return, 41.1¢ plus 49½¢, or 90.6¢. To include an 8% return on an assumed consumption of 1,000 feet would bring it to \$1.436.

The blue print following page 22 shows these costs. Line A gives the cost exclusive of return; line B, including 8% return; line C, the 75¢ rate with a 50¢ minimum; line D, the 85¢ block rate with a 50¢ minimum. The large part of the chart shows the cost in thousand feet of gas, the total cost up to 62,000 feet, the dollars being indicated on the left-hand side and the thousand feet on the lower part of the chart. In the upper left-hand corner of the chart I have given an enlarged portion of that part of the chart covering the cost

1750 of supplying gas up to 3,000 feet. It will be seen that the curve A, the Cost Exclusive of Return, crosses the 85¢ rate at 1,150 cubic feet and crosses the 75¢ rate at 1,600 cubic feet. That means that at the 75¢ rate all consumers using less than 1,600 feet do not return to the company any amount for a return on the investment; at the 85¢ rate, all consumers using less than 1,150 feet are being served without receiving sufficient revenue to return any interest on the capital employed.

On page 24, having determined these unit costs, I have taken from Exhibit No. 50, page 14, the total gas sold to consumers using over 50,000 cubic feet per month, and the revenue received from these consumers. I have then estimated the Cost of Service Exclusive of Return from the Unit Cost indicated on page 7, and found that the total cost of Service Exclusive of Return is approximately \$244,000.00 as against a revenue received from these consumers of approximately \$337,000.00.

Then I have estimated the cost of supplying these consumers, including an 8% return, using the unit costs as shown on page 7, and find that this cost amounts to approximately \$325,000.00, showing that the revenue received from the consumers using over 50,000 cubic

feet during the year 1915-16 was in excess of the costs, including 8% return as estimated in this analysis.

I made no segregation between different classes of consumers.

The larger part of New Business Expense, as shown by Account No. 1911 on page 11, is put into the Output column; that is, out of practically \$40,000.00 of New Business Expense I have charged \$7,000.00 to Consumers and the balance, approximately \$33,000.00, to Output.

I think the company makes an effort to get all the consumers it can. It certainly does not desire to take the 500 cubic feet and the 1,000 cubic feet consumer as a permanent proposition. The only hope of taking on those consumers would be that they ultimately would take more gas.

The last sheet of this exhibit gives an analysis of the information given on page 6 of Exhibit No. 69. I have simply taken that statement on page 6 which gives the average consumers using a certain amount for twelve months, and have enumerated the number of consumers using the different quantities of gas, and then determined the percentage of the total number using each quantity and less; in other words, opposite 1,000 feet it shows that while there are 5,899 consumers using 1,000 feet, on the average during that 12 months' period there are 23,039 who do not use more than 1,000 feet, which is 22.2% of the total number of consumers.

I have prepared a similar study for the fiscal year from July 1, 1913, to June 30, 1914.

A summary of this study was here introduced in evidence and marked "Plaintiff's Exhibit No. 74." The details supporting this summary were similar to the details in Exhibit No. 73, and were submitted to counsel for defendants and to Mr. Ellis, their valuation engineer, for examination. A true copy of Exhibit No. 74 is as follows:

EXHIBIT No. 74, PAGE 1.
Pacific Gas and Electric Company, San Francisco District, Gas Department.
Analysis of Costs for Year of July 1, 1913, to June 30, 1914, Inclusive.

Costs:	Prorated to—			Per cent prorated to—		
	Total.	Street lighting.	Consumers.	Output.	St. lgt.	Cons.
Maintenance of Generating Capital....	\$48,447.74	\$1,409.83	.....	\$47,037.91	2.91	.....
Maintenance of Transmission Capital..	7,939.18	169.63	2,109.91	5,659.64	2.14	26.58
Maint. of Distribution Capital (Excl. Acct. 1905)	135,522.27	5,163.69	94,492.70	35,865.88	3.81	69.72
Generating Expenses	981,342.28	28,557.06	.....	952,785.22	2.91	.....
Transmission Expenses	28,773.36	837.30	.....	27,936.06	2.91	.....
Distribution Expenses (Excl. Acct. 1907)	526,597.81	102,027.13	324,898.40	99,672.28	19.37	61.70
Total Maintenance & Operating Expenses (Excl. Accts. 1905 & 1907)	1,728,622.64	138,164.64	421,501.01	1,168,956.99	7.99	24.38
Maint. of Distribution Capital—Acct. 1905	14,524.98	.....	.....	.....	.....	.....
Distribution Expense—Acct. 1907	20,548.16	.....	.....	.....	.....	.....
Total Maintenance & Operating Expenses	1,763,695.78	.....	.....	.....	.....	.....
Taxes	148,221.57	7,574.12	26,442.73	114,204.72	5.11	17.84
Floating Debt Interest.....	20,463.48	.....	5,475.82	15,187.66	.....	26.50
Uncollectible Accounts	27,489.45	.....	7,284.70	20,204.75	.....	26.50
						73.50

Administrative Expense	162,382.40	.....	43,031.34	119,351.06	.....	26.50	73.50
Fire Insurance	44,946.55	1,245.02	1,191.08	42,510.45	2.77	2.65	94.58
Casualty Insurance	28,115.70	784.49	7,897.18	19,524.03	.....	.....	.....
Automobile Insurance	4,173.35	.....	2,842.05	1,331.30	.....	68.10	31.90
Replacements, Obsolescence, etc.	725,075.57	.....	.....	725,075.57	.....	.....	100.00
Sub-Total, Excl. Taxes and Re- turn	2,741,469.14	140,194.15	489,133.18	2,112,141.81	5.11	17.84	77.05
Total—Excluding Return	2,889,690.71	147,768.27	515,575.91	2,226,346.53	.....	.....	.....
Credit acct. Cost of Gas Delivered to Redwood District	46,083.79	.....	.....	46,083.79	.....	.....	100.00
Total Cost of Gas for S. F. Excl. Return	2,843,696.92	147,768.27	515,575.91	2,180,262.74	5.19	18.13	76.68
Total Sales to S. F. Dist. (Excl. St. Ltg. and Co. Use—1913-1914) .....	.....	.....	.....	4,160,915.9 M Cu. Ft.	.....	.....	.....
Average Number of Consumers 1913-14 .....	.....	.....	.....	.....	.....	.....	.....
Cost per Consumer per Mo.—Excl. Return .....	.....	.....	.....	.....	.....	.....	.....
“ “ M Cu. Ft. ....	.....	.....	.....	.....	.....	.....	.....
Return at 8%—Consumer & Output .....	.....	.....	.....	.....	.....	.....	.....
Total Cost Including 8% Return .....	.....	.....	.....	.....	.....	.....	.....

\$.524

.168

.002

1753

EXHIBIT No. 74, PAGE 2.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Return from Consumers Using Not Less Than 50,000 Cu. Ft. per Month, Year 1913-1914 (City and County of San Francisco and Exposition Excluded).

(From Exhibit #50, p. 6.)

Gas sold to Consumers using over 50,-

000 Cu. Ft. per month	49,510 M Cu. Ft.	
Revenue Received		\$31,295.27

Cost of Service, Exclusive of Return:

103 Consumer-months @ \$.416.....	\$42.85
49,510 M Cu. Ft. @ .524.....	25,943.24

Total Cost of Service, Exclusive of Return \$25,986.09

Cost of Service, Including 8% Return:

103 Consumers-months @ \$.791.....	\$81.47
49,510 M Cu. Ft. @ .692.....	34,260.92

Total Cost of Service, Including Return \$34,343.39

1754 The first sheet of this Exhibit No. 74 corresponds to page 7 of Exhibit No. 73, except that it covers the period from 1913-1914. The second sheet is a computation of the cost of service to consumers using over 50,000 feet and corresponds to sheet No. 24 in Exhibit No. 73.

I have prepared a statement containing an analysis of the cost of supplying gas in San Francisco for the fiscal year beginning July 1, 1914, and ending June 30, 1915.

This statement has been prepared in general in the same way as Exhibits Nos. 73 and 74. In this statement of the cost for the year 1914-15, I have included a summary sheet similar to those for the other two years, and also a sheet showing the cost to consumers using 50,000 cubic feet per month and over.

The first four pages in the exhibit contain a memorandum of the method of segregation and computation. This memorandum explains the method used in making the segregation and the computation for the year 1914-15 and relates to the more complete explanation which was given in connection with the segregation for the year 1915-16 as set forth in Exhibit No. 73. This memorandum simply ties in this segregation with that for the year 1915-16, insofar as methods are concerned.

This statement was here admitted in evidence and marked plaintiff's Exhibit No. 75. A true copy of said exhibit is as follows:

1755

EXHIBIT No. 75, PAGE 1.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs, Year July 1, 1914, to June 30, 1915, Inclusive.

Memorandum on Segregations and Computations.**Non-landed Capital:**

The non-landed capital used is an average value for the year 1914-15, exclusive of working capital, franchises and going concern, and amounts to \$14,006,644.18. This figure was arrived at as follows:

The figures for various items of plant values, distribution capital values and miscellaneous capital values, as per the E. C. Jones' valuation of June 30, 1914, were used as in the computations for the periods 1913-14 and 1915-16. From this was deducted an amount of \$142,982.66, distribution Item 8 "Gas Arcs," together with a credit of \$9,012.12 additions and betterments to Acct. 1205 "Commercial Arc Lamps" for the year 1914-15.

Items such as plants, etc., which were prorated on the basis of gas sales, were segregated on same for the year 1914-15.

Similarly the items of mains, etc. were segregated on the basis of charging one-third to consumer costs and prorating the balance to street lighting and output on the basis of the sales for 1914-15. The other items of capital were segregated on a basis of the resulting overhead percentages derived in the same manner as for the years 1913-14 and 1915-16, except in the following cases:

1756

EXHIBIT No. 75, PAGE 2.

1st. Garage, repair shop, and automobiles. In this case the percentage used was the same as that for 1913-14 and 1915-16.

2nd. The item of "Deduct items not carrying overhead," \$224,064.54. This item was taken as being prorated the same as for 1913-14 and 1915-16.

3rd. The item "Adjusted net Additions and Betterments, Gas Department, Non-Landed Capital for year ending June 30, 1915," \$276,481.20. The segregation of this is the same as for the year 1915-16, except that a credit of \$9,012.12 is deducted from output costs.

In determining the average value of capital for the year 1914-15, one-half of the additions and betterments to Gas Department non-landed capital and prorata of All Departments non-landed capital,

San Francisco District, for the year ending June 30, 1915, were deducted from the total value of Gas Department non-landed capital as of June 30, 1915, exclusive of working capital, franchises and going concern.

Landed Capital:

The various items and values of same for the year 1914-15 are the same as for 1913-14. These values were prorated by the same methods as for 1913-14 and 1915-16, using the percentages deduced for the year 1914-15. The garage and machine shop site was prorated, using the same percentages as for 1913-14 and 1915-16.

Working Capital:

For the year 1914-15 this item was prorated by the same method as for 1913-14 and 1915-16, using, however, the overhead percentages determined for the "Total cost exclusive of return" as determined for 1914-15.

EXHIBIT No. 75, PAGE 3.

Maintenance and Operating Expenses:

The same method was used for prorating maintenance and operating expenses for the year 1914-15 as was used for the years 1913-14 and 1915-16, these percentages having been determined from the capital segregations and as overhead percentages in the maintenance and operating expenses with, however, the following exceptions:

Acct. 1609 "Autos, Motorcycles, etc." and Acct. 1916 "Auto Expense" were segregated using the same percentages as were used for 1913-14 and 1915-16, these percentages having been based on an analysis of the costs for 1914. In Acct. 1913 "Office Salaries" a similar method was followed as for the other years, to-wit—charging \$32,000 of the total expenses to the Auditor and District Manager, of which \$6,000 was charged to street lighting and the balance prorated on the overhead basis to consumer and output, the balance of this account, \$117,862.07, being charged to consumer costs.

General Expenses:

Fire insurance was prorated using the same percentages of segregation as for the years 1913-14 and 1915-16, these percentages having been determined in detail for the year 1915-16. These were applied to the total fire insurance, computed on the basis of 70% valuation.

The casualty insurance for the year 1914-15 was determined by first deducting from the total casualty insurance the amounts charge-

1758

EXHIBIT No. 75, PAGE 4.

able to Accts. 1605 and 1907 and then after segregating the balance as between that accruing on office labor and on plant labor, applying to each class the percentage of segregation determined on the basis of the average percentages of segregation for the years 1913-14 and 1915-16, as used in the segregations for those years.

Automobile insurance was segregated using the same percentages as for the years 1913-14 and 1915-16, these being based on the 1914 analysis of this account.

The other items of general expenses were segregated on overhead bases, following the same methods as for 1913-14 and 1915-16.

Average Number of Consumers, Year 1914-15:

This figure was obtained from Exhibit #51, and amounts for this year to 109,322. The total sales to San Francisco District (excluding street lighting and Company use, 1914-15) amounted to 4,464,-250.1 M Cu. Ft. This figure was obtained in the same manner as the corresponding figures for 1913-14 and 1915-16, the figures used being obtained from the "H" Sheet records and agreeing with those shown in Exhibit #51.

EXHIBIT No. 75, PAGE 5.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Costs for Year of July 1, 1914, to June 30, 1915, Inclusive.

Refer- ence.	Costs:	Total.	Prorated to—		Per cent prorated to—			
			Street lighting.	Consumers.	Output.	St. ltg.	Cons.	Output.
Ex. 19	Maintenance of Generating Capital	\$54,588.58	\$1,523.02	.....	\$53,065.56	2.79	.....	97.21
"	19 Maintenance of Transmission Capital	2,951.04	66.40	\$570.76	2,313.88	.....	.....	.....
"	19 Maintenance of Distribution Capital (Excluding Acct. 1905)	123,947.47	3,829.94	86,683.80	33,433.73	.....	.....	.....
"	19 Generating Expenses	1,004,297.75	29,693.91	.....	1,034,003.84	2.79	.....	97.21
"	19 Transmission Expenses	34,117.89	951.89	.....	33,166.00	2.79	.....	97.21
"	19 Distribution Expenses (Excl. Acct. 1907)	549,319.54	105,023.95	342,680.60	101,614.99	.....	.....	.....
"	19 Total Maintenance & Operating Expenses (Excl. Accts. 1905 & 1907)	1,829,222.27	141,089.11	429,935.16	1,258,198.00	.....	.....	.....
"	19 Maintenance of Distribution Capital—Acct. 1905	12,234.78	.....	.....	.....	.....	.....	.....
"	19 Distribution Expense—Acct. 1907	28,576.36	.....	.....	.....	.....	.....	.....
	Total Maintenance & Operating Expenses	1,870,033.41	.....	.....	.....	.....	.....	.....
"	38 Taxes	168,266.45	9,019.08	31,533.13	127,714.24	5.36	18.74	75.90
"	38 Floating Debt Interest	24,818.68	.....	6,321.32	18,497.36	.....	25.47	74.53
"	38 Uncollectible Accounts	30,147.38	.....	7,678.54	22,468.84	.....	25.47	74.53

" 38 Administrative Expense	177,436.60	.....	45,193.10	132,243.50	.....	25.47	74.53
" 42 F're Insurance	44,964.80	1,245.52	1,491.57	42,527.71	2.77	2.65	94.58
" 30 Casualty Insurance (Excl. Accts. 1905 & 1907)	19,034.68	511.79	5,255.71	13,207.18	.....	.....	.....
" 33 Automobile Insurance	4,670.43	.....	3,180.56	1,489.87	.....	68.10	31.90
" 72 Replacements, Obsolescence, etc.	531,353.88	.....	.....	531,353.88	.....	.....	100.00
Sub-Total, Excluding Taxes and Return	2,661,648.72	142,846.42	498,755.96	2,020,046.34	5.36	18.74	75.90
Total Excluding Return...	2,829,915.17	151,865.50	530,289.09	2,147,760.58	.....	.....	.....
" 45 Credit account Cost Gas deliv- ered to Redwood District....	51,740.74	.....	.....	51,740.74	.....	.....	.....
Total Cost of Gas for S. F. Excl. Return.....	2,778,174.43	151,865.50	530,289.09	2,096,019.84	5.47	19.09	75.44
" 51 Total Sales to S. F. Dist. (Excl. St. Lighting and Company Use— 1914-1915) .....	.....	.....	.....	4,464,250.1 M Cu. Ft.	.....	.....	.....
" 51 Average number consumers 1914-1915.....	.....	.....	109,322	.....	.....	.....	.....
Cost per consumer per month, excl. Return.....	.....	.....	\$ .404	.....	.....	.....	.....
" " M Cu. Ft. " .....	.....	.....	\$ .470	.....	.....	.....	.....
Return at 8%—Consumer & Output.....	.....	.....	.364	.....	.....	.....	.....
Total Cost including 8% Return.....	.....	.....	\$ .768	.....	.....	.....	.....

1760

EXHIBIT No. 75, PAGE 6.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Return from Consumers Using Not Less Than 50,000 Cu. Ft. per Month, Year 1914-15 (City and County of San Francisco and Ex-position Excluded).

(From Exhibit 50, Page 10.)

Gas Sold to Consumers using over

50,000 cu. ft. per month..... 57,347.2 M Cu. Ft.

Revenue Received \$36,433.21

Cost of Service, Exclusive of Return:

107 Consumer months @ \$.404..... \$43.23

57,347.2 M Cu. Ft. Gas @ .470..... 26,953.18

Total Cost of Service, Exclusive of Return..... \$26,996.41

Cost of Service, Including 8% Return:

107 Consumer months @ \$.768..... \$82.18

57,347.2 M Cu. Ft. Gas @ .632..... 36,243.43

Total Cost of Service, Including Return..... \$36,325.61

1761 The witness further testified as follows:

You will note on the left-hand side of the fifth page of this Exhibit No. 75 the word "Reference." I have referred there to various exhibits from which the costs and the figures have been taken. These references will also apply to Exhibits Nos. 73 and 74. The computations contained on page 5 are correct to the best of my knowledge and belief.

I have also prepared another statement relating to this same subject.

This statement was admitted in evidence and marked plaintiff's Exhibit No. 76. A true copy of said Exhibit No. 76 is as follows:

ment.

and Or

1914-15.

Cons

Total
year.

9,322

7,040.

3,378.

0,855.

1,274.

9,291

9,137

5,823

20,048

5,274

7,862

30,711

14,308

22,457

34,436

9,627

78,333

22,398

.....

85,333

2,533

2,15

28

90,30

Pacific Gas and Electric Company, San Francisco District, Gas Department

Analysis of Gas Costs, Years 1913-14, 1914-15, and 1915-16, Showing Costs Which Have Been Directly Charged to Consumer Costs and

Reference, Exhibit #73.

	Year 1913-14.			Year 1914-15.	
	Investment average.	Consumer costs.		Investment average.	Total for year.
		Total for year.	Per cons. per mo.		
Average Number of Consumers During Year.....		103,252	....		109,352
Maintenance:					
1602 Services		33,048.48	....		27,048.48
1606 Gas Meters		32,361.53	....		33,361.53
1609 Autos, Motoreycles & Bicycles.....		12,706.44	....		10,806.44
Total Maintenance Items		78,116.45	.063		71,216.45
Distribution Expense:					
1900 Sets and Outs.....		49,163.28	....		29,263.28
1901 Complaints		28,334.41	....		29,134.41
1902 Inspectors		6,187.09	....		5,887.09
1903 Statements		20,540.73	....		20,040.73
1904 Collectors		72,281.18	....		75,281.18
1913 Office Salaries (Portion charged directly to Consumers).....		80,617.14	....		117,817.14
1914 Office Expense		24,191.53	....		30,791.53
1916 Auto Expense		16,239.36	....		14,339.36
Total Distribution Expense Items.....		297,554.72	.240		322,454.72
General Items:					
Taxes (5.25% x No. Cons. x Min. Charge).....		32,524.38	.026		34,424.38
Insurance—Fire, Casualty and Auto.....		11,840.31	.10		9,640.31
Depreciation—Estimated on Services & Meters Only at 5% on Capital		172,215.82	.139		178,315.82
Total General Items.....		216,580.51	.175		222,380.51
Total, Exclusive of Return.....			.478		
Return at 8% on Capital:					
Services & Meters.....	3,444,316.35	275,545.31	.222	3,566,678.10	285,345.31
Automobiles, etc.	31,187.51	2,495.00	.002	31,672.02	2,595.00
Garage & Repair Shop & Site.....	26,894.98	2,151.60	.002	26,894.98	2,151.60
Meter Repair Shop.....	3,551.12	284.09	....	3,551.12	284.09
Total Return at 8% on Capital.....	3,505,949.96	280,476.00	.226	3,628,796.22	290,380.00
Total Including 8% Return.....					

Pacific Gas and Electric Company, San Francisco District, Gas Department.

1915-16, Showing Costs Which Have Been Directly Charged to Consumer Costs and Omitting Items Prorated on an Arbitrary Basis to Consumer Costs.

Reference, Exhibit #73.

Year 1913-14.			Year 1914-15.			Year 1915-16.		
Investment average.	Consumer costs.		Investment average.	Consumer costs.		Investment average.	Consumer costs.	
	Total for year.	Per cons. per mo.		Total for year.	Per cons. per mo.		Total for year.	Per cons. per mo.
.....	103,252	....	.....	109,322	....	.....	112,338	
.....	33,048.48	....	.....	27,040.54	....	.....	32,537.62	
.....	32,361.53	....	.....	33,378.57	....	.....	27,266.76	
.....	12,706.44	....	.....	10,855.48	....	.....	7,061.80	
.....	78,116.45	.063	.....	71,274.59	.054	.....	66,866.18	.050
.....	49,163.28	....	.....	29,291.40	....	.....	27,382.69	
.....	28,334.41	....	.....	29,137.89	....	.....	33,779.54	
.....	6,187.09	....	.....	5,823.62	....	.....	5,794.85	
.....	20,540.73	....	.....	20,048.95	....	.....	20,089.11	
.....	72,281.18	....	.....	75,274.21	....	.....	77,250.29	
umers).....	80,617.14	....	.....	117,862.07	....	.....	138,084.73	
.....	24,191.53	....	.....	30,711.30	....	.....	31,476.54	
.....	16,239.36	....	.....	14,308.00	....	.....	17,254.73	
.....	297,554.72	.240	.....	322,457.44	.246	.....	351,112.48	.260
.....	32,524.38	.026	.....	34,436.43	.026	.....	35,386.47	.026
.....	11,840.31	.10	.....	9,627.84	.007	.....	9,775.32	.007
at 5% on	172,215.82	.139	.....	178,333.91	.136	.....	183,972.14	.137
.....	216,580.51	.175	.....	222,398.18	.169	.....	229,133.93	.170
.....	.....	.478	.....	.....	.469	.....	.....	.480
.....	3,444,316.35	.222	3,566,678.10	285,334.25	.217	3,679,442.83	294,355.43	.218
.....	31,187.51	.002	31,672.02	2,533.76	.002	31,682.13	2,534.57	.002
.....	26,894.98	.002	26,894.98	2,151.60	.002	26,894.98	2,151.60	.002
.....	3,551.12	....	3,551.12	284.09	....	3,551.12	284.09	....
.....	3,505,949.96	.226	3,628,796.22	290,303.70	.221	3,741,571.06	299,325.69	.222

1762

PLAINTIFF'S EXHIBIT No. 76, PAGE 1.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Analysis of Gas Costs, Summary of Unit Consumer and Output for the Years 1913-14, 1914-15, and 1915-16.

	Unit costs.		
	1913-14.	1914-15.	1915-16.
Unit Consumer Costs per Month:			
Exclusive of Return on Capital..	\$.416	\$.404	\$.411
Including 8% Return on Capital	.791	.768	.781
Unit Output Costs per 1,000 Cu. Ft.:			
Exclusive of Return on Capital..	.524	.470	.495
Including 8% Return on Capital	.692	.632	.655

(Here follows paster table marked page 1763.)

1764 The first sheet of Exhibit No. 76, shows the unit cost per consumer per month and per thousand cubic feet, which have been derived by the analyses presented in Exhibits Nos. 73, 74 and 75, the unit costs being given on this page both exclusive of return and inclusive of return, and in comparative form, in order that the variation from year to year might easily be noted.

Having in mind that the segregation and analysis that I have made in Exhibits Nos. 73, 74 and 75 carried a number of assumptions and prorations of items which, without a close study of the matters and of the exhibits, would possibly tend to weaken the strength of the analysis, I have prepared in the second sheet of this statement (Exhibit No. 76) a summary of the items which have been charged to Consumer Cost during the three years in question and which have been directly charged to Consumer Cost on the basis of the nature of the items themselves and do not involve any prorating or arbitrary methods in apportionment.

The second sheet of this statement (Exhibit No. 76) shows the unit cost per consumer per month for each of the three years and also shows the nature of the items. For instance: Under the year 1915-16, I first give the average number of consumers during the year; next, the items of Maintenance of Gas Service and Gas Meters, which have been directly charged against Consumer cost. The third item is Maintenance of Automobiles, Motorcycles and Bicycles.

This last item was segregated against Consumer cost by making a careful analysis of the use of all automobiles on which this maintenance was incurred. For instance, the automobiles of collectors, meter-readers and such class of work are clearly and definitely consumer costs.

Under the item Distribution Expense, the items of Sets and Out, Complaints, Inspectors, Statements and Collectors, etc., are charged 100% to Consumer costs.

The next item, Office Salaries, has been apportioned and charged directly to Consumer cost, on the basis shown in Exhibit No. 73. This item was divided up into different departments, charged against office salaries. The district auditor's and district manager's offices were then apportioned as an overhead charge.

The balance of the items, Bookkeeping Department, etc., were charged as Consumer costs. I think the variation between the amount, approximately \$80,000.00, charged against Office Salaries in the year 1913-14, and the amount of approximately \$117,000.00 in the year 1914-15, was partly due to the fact that there was an extra expense in the latter year for the keeping of the books of account in connection with the rate litigation and partly due to the increase in the number of consumers and increases in salaries. The amount for the year 1913-14 is rather below normal, because during that year there was a strike among the employees of the company and for a while we left off keeping a number of records we usually keep. That is reflected also in Gas Distribution Office Expense, which is low as against subsequent years.

The decrease in the amount charged for maintenance of auto-

mobiles is due probably to the fact that there were some heavy repairs and renewals in 1913-14.

1766 The item Insurance is an estimated amount and is the proportion shown in Exhibits Nos. 30, 33 and 42.

In order to avoid any question about the proper method of prorating taxes, I have included $5\frac{1}{4}\%$ of the minimum charge, which is 50¢. In other words, we pay a tax of $5\frac{1}{4}\%$ on the gross revenue basis. It is 2.6¢ per consumer per month.

In the previous segregations I put all the items for Replacements and Obsolescence as shown in Exhibit No. 72 in the Output column, for the reason that I had no segregation of those items. I did not think it entirely proper to do that and I realized that a lot of those items should go to Consumer cost; so in making up this table in Exhibit No. 76 I put in the Consumer cost an Estimated Depreciation on Services and Meters at 5%. That works out 13.9¢ per consumer per month and would give us a total exclusive of return, per consumer per month, of 47.8¢ for the first year, which includes 13.9¢ for depreciation not included before. So, if you take that depreciation off, you will have left 33.9¢ as the part of Consumer costs included in the 41.6¢, as shown on the previous page for Consumer cost, exclusive of return, during the year 1913-14, or practically 34¢ out of 41.6¢, which can be and has been directly apportioned against Consumer costs without any arbitrary assumptions being made.

The other items of Capital are very few in number, that I have charged in as a direct consumer cost, although a number of items could be very easily included. Services and Meters is the main item of Capital on which an 8% return creates a cost per consumer 1767 per month of 22.2¢.

The estimate of Depreciation is based on 5% on Capital. I do not think that there will be much question about the range of depreciation allowance on meters and services; it is a matter that is pretty well agreed on by engineers, and I took 5% as being a minimum allowance; it is equivalent to about a 15-year life on a 4% sinking fund basis, for services and meters.

The differences between the figures shown in this Exhibit No. 76 and those shown in Exhibits Nos. 73, 74 and 75 are, first, that I have omitted the items which were more or less arbitrarily apportioned; and, second, that I have added a sum for the estimated depreciation on services and meters, at the rate of 5% on the value of Capital.

Cross-examination:

In this Exhibit No. 76, the charges for depreciation estimated on services and meters are exclusively a Consumer charge. That includes all the services and meters that the company has. I think the allocation of the whole cost of the services and meters to consumers is a proper one.

The length of the services in the industrial district would be a little less on the average than in the residential district, because in

the industrial district the meters are just inside the property wall of the buildings. In the residential districts, a number of the meters run from 10 feet to 15 or 20 feet back of the property line. As a matter of fact, the extra cost of digging back of the property line to place a service is not proportionate to the length of the 1768 service, because the chief expense in installing services is getting it through the pavement and the sidewalk. The services to industrial consumers are generally larger than to the residential consumers, and the additional expense would come in because of the size rather than the length. You must bear in mind the tremendous number of small consumers pulls the average cost of the service down to very close to the smallest service.

The cost of meters varies from \$4.25 for a three-light meter up to \$185.00 for a three-hundred-light meter. We have practically 100,000 meters costing \$5.25 or less, while there are several thousand which cost from \$10.00 to \$185.00 apiece. I have worked out the average cost of a service and meter as included in the Jones inventory, and find it is \$34.03, including the meter, the installation and the service; that is, with the additional overhead, the basic figure used for the average consumer, in the consumer cost, in Exhibits Nos. 73 to 76. Now if, instead of that average cost per meter and per service you substituted the minimum cost, that is, the cost for the smallest-sized meter and service, you would reduce your cost to about \$27.60, using a five-light meter. If you used a No. 1 iron meter, it would be \$27.98. That would reduce your return, at 8%, about 50¢ a year and it would reduce your depreciation about 30¢ a year, or a total reduction of approximately 80¢ a year; that is, 6½¢ a month.

The cost of installing the meter varies from \$1.43 to \$45.10, and the cost of the meter connection, from \$1.80 to \$45.10, so there is quite a difference in the cost of these items to the small consumer and to the large consumer.

1769 Mr. L. P. LOWE, a witness called on behalf of defendants, testified as follows:

Q. Now, coming down to the question of the effect of rates on consumption, you have stated that you are familiar with the gas business in the vicinity of San Francisco. Is it your opinion that if a reduction should be made in the residential gas rates in this vicinity, from 85¢ to 75¢, you could determine with any degree of accuracy the gross revenue which the company would be likely to receive under the 75¢ rate, by merely applying a mathematical proportion to the revenue under the 85¢ rate; or would the reduction in rates affect the consumption among residential consumers?

A. I don't think it would be possible to do any more than guess at what might happen. I do not think there could be any scientific basis of reasoning on that score. There is no question but that the lowering of the price of gas makes it possible for new lines of business to use gas in place of other fuels, but it does not make any difference how much you lower the price of gas, if a person is already

using all the gas that he possibly can. On the other hand, there are many, many consumers who are using gas for cooking, because of the great convenience, but they are using wood and coal for heating because it is much cheaper. Now, the lower the price of gas, the more nearly you approach the price of the solid fuel, until there comes a time when people will begin to use gas, even though it may cost more for heating purposes than solid fuel. That has been the

history of the gas business, and it is well recognized that
1770 reduction in the price of gas increases the use of gas; that is

to say, it opens up new fields of possible consumption, but you may not be able to sell more gas because other things may come in and cause the loss of a certain amount of gas business. For instance, electricity is gradually driving gas lighting out of existence, even though gas lighting may be, and probably is, the best and cheapest light in the world, but the convenience of electricity is so great that people are quite willing to pay more for it. That same principle applies to the use of gas for a fuel, if its cost is not too much in excess of the cost of other fuel.

I think that residential consumers concern themselves very little with the amount of gas that they use. Our experience is, that they object to the size of their bills, yet when you tell them that they have consumed a certain number of cubic feet, that means nothing to them. If they can afford the gas company's charge, they use the gas; if it is more than they can pay, they cut it out.

The effect upon a company's revenue of a reduction in gas rates accompanied by an active campaign for increasing the sale of gas would depend on local conditions and also upon how many of the gas consumers were already using gas to the extent of their heating requirements.

1771 Taking San Francisco as a community and with which, as

I say, I am fairly familiar,—I believe that a very largely increased gas business can be worked up for fuel purposes.

I know that there are a great many people in San Francisco still using coal for fuel; I don't know in terms of percentage the amount of gas that is used for heating purposes but I would be inclined to think as just a rough guess that possibly 75 per cent of the heat in San Francisco was solid fuel, that is to say, wood and coal today—possibly it is very much more than that.

Now if the company, instead of making such a campaign among just its gas consumers, should attempt to increase both its gas and electric business concurrently, I would not expect the solicitors to accomplish very much in the way of obtaining gas business. My experience has been that an electric man makes a very poor gas man. Electric men are very, very energetic, and gas men have not been so. Electric men seem to be interested only in developing the electric business, and they look upon gas somewhat as a sort of back number, and they think there is nothing that gas does that electricity cannot do better; so they don't have the welfare of the gas business at heart. To develop a gas business, I think you would have to get a solicitor that was a gas man, and I think then that the business would grow very rapidly.

1772 Q. Speaking as a gas producer, do you believe hat it is practicable for a gas business to make its rates on the basis of charging to each consumer or to each class of consumers the exact cost of serving them, or will not certain classes of consumers have to carry the inadequacy resulting from serving very small consumers and the company depend on the average returns?

A. If I understand your question, Mr. Searls, it is this: Do I think it is possible to establish some sort of a basis of rates that will make each consumer pay his fair share of the cost of service?

Q. I don't mean that too literally, Mr. Lowe. Of course, it would be impossible to take 100,000 consumers and make each one a different rate; but taking each class of consumers, say small consumers using less than 1,000 feet, and those running up to 5,000 and 6,000 and so on, is it practicable to grade your rates so as to charge each class exactly the proper amount, or does a company as a practical operating proposition have to depend on the average returns and make rates that will get the most business?

A. While many, many attempts have been made to determine some scientific method of basing rates very little headway seems to have been made. Gas companies do attempt to so adjust their rates that the consumer using the smaller quantity of gas will pay a fair share of the cost of service. However, it is more or less

1773 guess work. I think that after all is said and done the company considers the average consumer, the amount of gas, and the price it is to get for its gas based on the average use of gas per consumer rather than on the individual use. I think it is true that a very great number of consumers are served at a loss; in fact, we know in the gas business that that is so. The larger consumers must therefore bear the losses incurred in serving certain smaller ones. If you were to attempt to find a rate that you would charge the smaller consumer, to be fair to the larger consumer, the difference would be so great that you lose all the small business. It is not a question entirely of making money on every consumer you serve. It seems to me the duty of a public utility is to serve the community, that is to say, you must consider the matter of rates as a community proposition rather than as an individual one. To that extent I think that the only way you can fix rates satisfactorily is to consider the price that you must get on the average. I want to go a little further on that. That applies to the average consumer. Now comes the opportunity to sell gas in large quantities for industrial purposes, or for hotels or something of that kind, where they cannot afford to pay the rate that you get on the average, what you call the average rate; a certain amount of money can be made in serving those consumers which at first glance would seem to be a loss but really

1774 a profit. I can best illustrate it, I think: If gas were costing you \$1.00 a thousand to make it and 50 cents of that cost was fuel and 50 cents labor, and with the same labor you could make a great deal more gas, with only the added cost of materials, you could afford to sell the gas at very much less than its apparent cost on your books and still make a profit. Do I make myself clear?

Q. Yes, I think so.

A. Gas that apparently costs you a dollar you could afford to sell at 75 cents, and you could make a 25 cents profit.

Q. 1,000 feet of it would cost you \$1.00; if you could make 10,000 with the same labor your average cost would not be \$1.00, would it?

A. No. For instance, if you were making a certain amount of gas today and the labor you are using to make that gas will make a great deal more gas, then the cost of the extra gas is only the material that goes into it; for very large purposes you can afford to sell that gas at a very much less price than you would have to have on the average to get an adequate return. It is on that theory that the low rates are made for industrial purposes.

1775 Mr. JOHN A. BRITTON, called on behalf of defendant, testified as follows:

Mr. Searls:

Q. At the time Mr. Holberton testified here some question arose as to statements made by himself and by you, Mr. Britton, before the Board of Supervisors in the 1914 rate hearing. By way of partial rebuttal to that and also by way of clearing up the situation I desire to ask you, Mr. Britton, whether the statements, of which I have a stenographic transcript here, made at the time of that hearing were the statements which were actually made.

Mr. Britton I am reading to you from page 208 of the transcript of the proceedings before the Board of Supervisors at a meeting held on Monday, the 22nd day of June, 1914. These questions were asked:

"Supervisor Power: Mr. Britton, what will be the policy of the Company with 75 cent gas, if it be voted again this year?

"Mr. Britton: In what respect, Supervisor Power?

"Supervisor Power: I want you to announce what the policy of the company will be. I was in the room and heard some discussion upon that point.

"Mr. Britton: That the company will be unable to make any extensions in the outlying districts where gas is not already supplied.

1776 "Supervisor Power: Will they take the case into court if the 75 cent gas rate is fixed?

"Mr. Britton: Oh yes, They will take it into court.

"Supervisor Power: If the 80 cent rate were fixed, what guarantee will your company give this Board in regard to the outlying districts?

"Mr. Britton: The company will guarantee that it will be very liberal in the matter of extensions, and meet every reasonable demand that may occur for gas extensions, where it is now refusing them. As to the amount of money to be expended, I could only repeat what I said before, that, during 1912, when the rate was a liberal one, we were spending for labor alone \$300,000 more in a year than we have spent in the past year.

"The Chairman: Any further questions to be asked of Mr. Britton?"

"Supervisor Hilmer: Some of these men will be put back to work again?"

"Mr. Britton: No question about that at all, Mr. Hilmer. If the rate of 80 cents should be given to us, while I can't foresee the applications that will be made for extensions, yet, judging by the past and your liberality then, I should say that at least 250 or 300 of those men could immediately go to work. In fact, if today we were able to raise the money by a liberal rate, I can say that there would be at least 400 more men at work in the gas department than there are at work there now.

"Supervisor Deasy: Have you got that many applications up in the office for extensions of gas mains and electricity?"

"Mr. Britton: That will take that number of men, yes.

1777 "Supervisor Deasy: Are they demanding it in the outlying districts?"

"Mr. Britton: Daily and constantly.

"Supervisor Deasy: They are?"

"Mr. Britton: That we are turning down—daily and constantly."

Then it goes on; I will now read on page 244:

"Supervisor Suhr: Will the representatives of the Company be satisfied with 79 cents?"

"Mr. Britton: For the benefit of Supervisor Suhr, I will say yes.

"Supervisor Suhr: Would you make the extensions and put the men to work?"

"Mr. Britton: Yes."

That is all I desire to read in evidence. If there is anything further you want, Mr. Bosley, or any further statement that Mr. Britton wants to make, he can make it.

I will ask you first, Mr. Britton, those were the statements you made at that time, were they?

A. Yes.

Mr. Bosley: You desire to have them considered in evidence?

Mr. Searls: I desire that those statements be considered in evidence as an admission on the part of the company as evidenced by the statements of its general manager made at the hearing.

Mr. Bosley: I object to the admission of the statements in evidence upon the ground that they are immaterial, irrelevant
1778 and incompetent, as they purport to show negotiations for the adjustment of a matter in dispute, relating to a compromise of matters in dispute, and that it does not appear that these negotiations resulted in any agreement or any adjustment being arrived at; that the statement by Mr. Britton of what he would do under certain circumstances was tentative, and not being accepted is in no way binding upon the company in this proceeding; it does not tend to show what rates are in fact or were in fact at that time reasonable.

Mr. Searls: I don't offer it, your Honor, for the purpose of show-

ing that the rates were, as a matter of fact, reasonable at that time, but showing that at that time the general manager of the company was satisfied and willing to go ahead and make considerable expenditures of money if such rates could be obtained. For whatever probative effect evidence of that sort has as a statement made on behalf of the company, I think it should be admitted.

The Master: I think the objection must be sustained. I don't think that sort of evidence is worth anything. I am speaking of my own point of view, I don't know of any way in which I could use it at all.

Mr. Bosley: Then I have nothing further to offer on that. I was about to call attention to certain other statements showing that the matter of the rate was in litigation at that time.

1779 The Master: I assume it is shown that there was not an agreement to that effect.

Mr. Bosley: The date of that hearing was June 22, 1914.

Mr. Searls: Your Honor will bear in mind that you have already admitted in evidence Mr. Holberton's statement that the company had made such statements, in a general way, at the hearing. This was merely to show the exact words that were used.

The Master: Yes, I know, Mr. Searls. I expect I am inconsistent about it, but that is the way it strikes me. In other words, in these proceedings, as you must have observed, I look at the matter very much at the way in which it is going to affect my mind with respect to the problem. It might be that at that time I did not fully appreciate the situation. When the issue is, as here, whether a particular rate is a valid rate, how proposed concessions by the executive officers of the company will give any light on the matter I cannot see. I think I will let the ruling stand.

On a subsequent date, the Master, referring to his ruling admitting in evidence the above mentioned statements made by Mr. Britton before the board of supervisors, ruled as follows:

The Master: Now, as to a ruling on page 2269, with reference to a statement made by Mr. Britton before the board of supervisors, 1780 that ruling will be reversed and the statement will be admitted. The plaintiff may recall Mr. Britton. I prefer to be liberal in such matters, although it may very well be that in the final consideration of the evidence I will find logical objections to making use of it. I think it should be there for the parties to argue about, whether I accept the argument or not.

1781 Mr. C. L. CORY, a witness called by the plaintiff to testify with respect to the going concern value of plaintiff's San Francisco gas department property and business, gave during the course of his cross examination by counsel for defendants the following testimony:

Q. Suppose instead of the supervisors reducing the rates to 75 cents the company itself had reduced them from 85 cents to 75 cents, do you think it probable that there would have been a partial com-

pensation in gross revenue resulting from that reduction by reason of the larger amount of gas that would be consumed at the lower rate?

A. I would only be venturing an approximate opinion if I gave such an opinion; it might or it might not. I think it is one of the most difficult studies to make to determine what is the most advantageous rate to adopt for the commodity and the service rendered by public utilities, whether it shall be perhaps in some cases slightly increased or in other cases diminished.

Q. Then we arrive at the point that we have to accept the public utilities' determination as being the conclusion as to what is a reasonable rate on which to base earnings and consequently capitalize them?

A. No, I don't think that. Public utility managers, as well as all other individuals—their decision is not infallible; all I mean to say is that there are conditions which are in absolute control of the rates as well as the cost of the service rendered by public utilities; their control by rate-regulatory bodies is certainly restricted and secondary to the conditions that exist. Take the use of gas, for instance: At the present time and at the prices paid for gas, in large cities, certainly in California, it is sought after by the public; it is convenient, always ready for use, you need it no longer than you need the fuel or the light; it is less expensive in many ways than other kinds of fuel—I won't say light, but other kinds of fuel; now, if the price were considerably increased, no doubt other substitutes would be found; the law of supply and demand will guide in the product of a public utility, perhaps in some cases to a limited degree, but just as it will in anything else.

Q. Suppose it was not considerably increased, but only slightly increased, would the same rule apply?

A. It would depend upon conditions; in my experience, increase of rates after a period that rates have been at a certain figure very definitely and very quickly reduces the income, because of the fact, and it is an historical fact, that all the service rendered by public utilities has in general, considering the character of the service rendered, dropped in cost continuously; when the cost is for any reason increased, the psychological effect upon the consumers is very marked in reducing the use.

1783 Q. Is the reverse true in your experience, where the rate is decreased the consumption increases and that, in a large measure, offsets the lowering of the revenue?

A. That is very difficult to say. It is observable, in analyzing a large number of bills of a public utility company in attempting to get at the real cost of giving service, that in the household, if the water bill, the gas bill, the electrical bill, the telephone bill should run a certain amount—I should exclude the telephone bill, because that is more often a flat-rate charge—that even if the price is reduced the bill remains just about the same, of course taking into consideration the different seasons.

Q. That means that the consumption is increased?

A. That means that the consumption is increased and the revenue for the larger quantity of service remains reasonably stationary.

The Master:

Q. You are talking about gross revenue?

A. Yes. The gross revenue for this particular class of consumers would be practically the same. The net revenue is sometimes, unless it is counteracted by a large extension of the service and the business—reduced.

Mr. Searls:

Q. You spoke of large cities in California; do you know what the effect has been of the reduction of gas rates in Los Angeles to 70 and 75 cents, I believe it is, that is charged?

1784 A. Yes, I know very definitely what the effect has been, but the great difficulty is that there is a change in the heat unit value by the introduction of the natural gas; there has been a reduction in the number of cubic feet of gas per consumer, a very, very large reduction, indicating that certainly for fuel in Southern California what is really purchased is heat units rather than the number of cubic feet of gas. It is a very serious situation.

Q. With respect to the manufactured gas down there, what was the effect of the reduction in rates—did it increase consumption?

The Master: That is, before natural gas came in?

Mr. Searls: Yes, sir.

A. The analysis of a very large number of bills seems to indicate an increased consumption and substantially stationary monthly bills, particularly for large consumption, in apartment houses and things of that kind, and the small bungalows—the bills that ordinarily ran from the minimum bill up to \$2.50. I had quite a little bit to do with that study; it was made in an attempt to determine the cost of the elements of service of gas because of the anticipated difficulty with the introduction of natural gas.

1785 On motion of counsel for defendants, the Master admitted in evidence and marked as defendants' Exhibit No. 102 the eighth annual report of the Pacific Gas and Electric Company covering the calendar year 1913. Counsel for defendants directed the Master's attention particularly to the third paragraph of a subdivision of that report under the caption "Stability of Revenues." A true copy of said subdivision of said report contained in said Exhibit No. 102, excepting a table showing gross revenues for the calendar years 1907 to 1913 inclusive, is as follows:

"Stability of Revenues.

"The public regulation of utility rates, which is engaging the attention of many state governments in an increasing degree, is not a novelty in the State of California. For thirty-five years its municipalities have possessed and have exercised this power. While it is a reassuring fact that your Company during its entire history has

successfully carried on its business under these conditions and is not, therefore, confronted with wholly new and untried public policies in this respect, the question whether its revenues are being derived from reasonable rates or whether its margin of profit is such that its earning power may be seriously impaired by enforced reductions in its tariffs, is one of importance to its stockholders.

"The average rate realized from all gas sold by this Company in 1912 and 1913 was 88 cents per 1,000 cubic feet. With the exception of one small community of about 1,000 people, where, owing to special conditions, a rate of 9 cents per kilowatt hour prevails, the Company has no basis or top electric rate that is higher than 28¢ per kilowatt hour for residence lighting nor higher than 7¢ per kilowatt hour for commercial lighting. In some of the larger cities lighting rates are still lower and in all cases schedules are graduated to progressive reductions for increased usage. Power rates are determined by the conditions of each case, and are naturally very much lower than these lighting rates. The Company's present tariffs are the result of the policy which it has consistently pursued for a number of years of giving its consumers the benefit of lower prices whenever conditions warranted it, and the most satisfactory and reassuring feature of its earnings is that they are based upon such reasonable rates. Within the past two years the Company has also equipped itself with, and now has at its command, such exact and detailed knowledge of the cost of its operations and of the value of its property at the service of each of the communities served by it as to justify the firm belief of your management that the earning power of the Company cannot be justly impaired by any revision of its schedules but that, on the contrary, the very large additional investments made within recent years, from which no adequate return has yet been realized, entitled it to and will bring to it a large increase in present earnings.

"The Company's gross operating revenue in 1913 was \$15,869,006. This revenue was derived from 349,417 consumers, or at the average annual rate of \$45.40 per consumer. It is obvious that the Company's earning power rests upon a broad foundation and is not dependent for its stability upon the custom of any single industry or group of consumers. There has also been a gradual decline within recent years in the average annual gross return per consumer. This is indicative of the comparatively more rapid increase and growing preponderance on the Company's books of the smaller users of its products. While the Company's larger unit business is showing very satisfactory increases, as brought out in the statement on Page 10, and will continue to contribute its quota to the future growth of revenues, the stabilizing influence of the smaller unit business, which is not materially affected by adverse business conditions and may be depended upon for steady growth and increasing returns under any and all conditions, is a factor of undoubted importance.

"The wide geographical distribution of the Company's business, its diversified character and the consistent growth in every department (see following table), are also important factors in any analysis of the conditions making for stability of revenues."

N. B.—The Master's discussion of the reasonableness of the maximum rate fixed by the ordinances here drawn in question is to be found on pages 130 to 134 of his printed report.

1787

SUBDIVISION VIII.

Evidence Relating to the Economic Principles Involved in the Problems Arising Out of Regulation by Law of Rates Charged for Services and Commodities Furnished to the Public by Public Utilities.

1788 Mr. FRED R. FAIRCHILD, called as a witness for the plaintiff, testified as follows:

My full name is Fred Rogers Fairchild. I am forty years of age and live at New Haven, Connecticut. I am a professor of political economy in Yale University and have occupied that position since 1913. For nine years prior to that time I was teaching political economy at Yale University with the rank of instructor for four years and for the five years following with the rank of assistant professor. After a high school education, I graduated in 1898 from Doane College in Nebraska with the degree of Bachelor of Arts. Then, after three years of preparatory school teaching, I studied for three years in the graduate school of Yale University, receiving the degree of Doctor of Philosophy in 1904. I am a member of the executive committee of the American Economic Association. I am the secretary and member of the National Tax Association and am a member of the National Conservation Association and the American Forestry Association. I have published a number of papers on subjects that may be considered embraced within the general scope of political economy. The following is a list of my principal publications:

The factory legislation of the State of New York, Publications of the American Economic Association, November, 1905, 218 pages.

1789 Our currency reform problem,—an article discussing the banking situation—published in the Yale Review of May, 1907, 23 pages.

Taxation of timberlands, in the Report of the National Conservation Commission, 1909, 52 pages.

Forest taxation, in proceedings of the Sixth Conference of the National Tax Association, 1912, 31 pages.

Various other articles, addresses and reports on forest taxation.

Report of the Special Commission of the State of Connecticut on the taxation of certain corporations, 1913, 238 pages; I was a member of that commission and wrote practically the entire report.

State and local taxation of banks, American Economic Review, December, 1916, 18 pages.

Report of a special study of the Connecticut tax system made for the Connecticut Chamber of Commerce, 1917, 66 pages.

I have specialized for the last six or eight years on the subject of taxation, particularly with reference to the taxation of corporations and of forest lands. The subjects of value and exchange are dealt with in our general course in political economy which I have taught practically continuously since 1904. I have made a study of the economic principles relating to the determination of reasonable rates as charged by public utilities. I have embodied the result of this study in a statement which I have with me.

The witness thereupon read as his direct testimony said statement, a true copy of which is as follows:

1790 *The Economic Principles Relating to the Determination of Reasonable Rates as Charged by Public Utilities.*

I. Value. Certain fundamental economic definitions and principles.

II. Private and public business.

III. Competition and monopoly.

IV. Relation between value of the business and reasonable rate.

V. Relation between cost and reasonable rate.

1. Reasonable rate should tend to equal cost.

2. Reasonable rate above or below cost.

3. Classification of cost.

4. Reward for labor of direction and oversight.

5. Return on capital.

6. Depreciation in its relation to value and rate base.

7. Obsolescence.

8. Summary—cost and reasonable rate.

VI. Relation between utility and reasonable rate.

VII. Summary.

1791 *The Economic Principles Relating to the Determination of Reasonable Rates as Charged by Public Utilities.*

I. Value.

For a clear understanding of the economic aspects of the problem of legal rate regulation, I believe it will be of advantage to state briefly the fundamental nature of value and the economic laws which govern it. The value of any commodity or service is the amount of some other commodity or service for which it is ex-

changed. I shall use the term "good" to mean anything, commodity or service, that has value. Price is best defined as the amount of any other good that is exchanged for one unit of the commodity or service in question. Thus, value equals price multiplied by quantity. For a unit of the commodity or service, value and price are the same thing. Both price and value are usually (though not necessarily) expressed in terms of money.

As thus defined and used by economists, the term value has a definite and precise meaning. The term is sometimes used loosely without an exact idea of its meaning, and when so used has been the cause of much confusion.

The first essential element in value is utility. By this we mean the power to satisfy some human want; that is, to render some useful service. Nothing that lacks this power can have value. The converse, however, is not true. It is not true that everything that has utility has value. Air, for example, has great utility but no value, because it is so freely supplied by nature that everyone may take what he needs without giving anything in exchange.

1792 The second element of value is therefore limitation of quantity. This may be due to the fact that the quantity is definitely fixed once for all, as the paintings of an old master, or the land within a certain section of a city. Most articles, however, are not thus absolutely fixed in quantity. They may be more or less indefinitely reproduced, but their quantity is limited by the necessary cost of production. For most practical problems we may therefore say that the second element in value is cost of production.

Value depends jointly on utility and cost. Neither circumstance alone can determine price or value. An understanding of this principle is necessary in order to avoid certain common confusions. The attempt to find the cause of value in utility alone encounters the familiar fact that many articles of absolute necessity to life have no value or are valued lower than some of the most frivolous luxuries. A common error is to assume that value and utility are the same thing, or to find a special kind of value, as "value in use," which is distinguished from "exchange value." Confusion is likely to result from such use of terms. Clear analysis will be best served by using the terms as I have defined them, in harmony with their prevailing use in economics.

On the other hand cost alone can never explain value. Frequent attempts are made to determine value by cost, and such attempts are continually reaching results which, on the face of the plain facts, are absurd. A diamond worth thousands of dollars, may have been brought to the market at a cost less than that of producing a ton of coal worth \$5.00. A 1917 automobile that cost \$1,000 may be
1793 more valuable than an ancient model that cost \$5,000 even supposing the latter to have suffered no deterioration from use. Every day the scrap heap claims articles whose value is gone, in spite of the cost of producing them.

It must be remembered that both utility and cost are variable quantities. Successive increments of a good satisfy different wants or wants of different intensity. Utility varies therefore with the

amount of the commodity on hand and is different for different persons. Cost likewise depends on the quantity produced and is not the same for all producers.

It is probably not necessary to give a lengthy explanation of the process by which price (and therefore value) is determined by utility and cost. Value implies exchange, and is normally determined by the competition of sellers and buyers in the market; that is, by supply and demand. Market is best defined as a place where prices are determined by supply and demand. It is utility that governs demand; cost that governs supply.

In spite of temporary discrepancies, purchasers tend, in the long run, to demand the article so long as it can be obtained at a price not greater than the estimate which they place upon its utility. Likewise sellers tend, in the long run, to offer to supply the article so long as it can be sold at a price not less than its cost of production. Cost here includes, of course, all costs necessary to deliver the good to the purchaser, and contains a normal profit sufficient to make it worth while for enterprisers to supply the article. By normal profit I mean both a reasonable return on the capital invested and a reasonable reward for the labor of direction and oversight on the part of the owner. The market price is determined when demand and supply are equal, and at that point the utility of a unit of the commodity tends to equal its cost. Since utility and cost are both variable, it must be evident that the utility and the cost which thus become equal are both marginal amounts. The marginal utility is the utility to the last purchaser, to whom it is just worth while to pay the market price. To the other purchasers the good may have a higher utility. But in a given market all pay the same market price. The marginal cost is the cost to the least efficient producer whose contribution is necessary to supply the demand. Other producers may be able to furnish it at less cost. But in the given market all get the same market price. Every voluntary exchange is an advantage to both the seller and the buyer. Otherwise it would not take place. The explanation lies in the fact that price is determined by marginal utility and cost. The buyer gets a utility greater than that of the money with which he parts. The seller receives money that represents more than the cost of the article to him.

The foregoing statements assume an article which is being currently bought and sold in the market, such as wheat, cotton, the shares of stock of certain corporations, etc. For such an article there is practically always a definite value that can be ascertained and stated exactly. But for many articles there is no such market. Sales are infrequent and irregular. The only thing that exactly fixes value is an actual sale, and that fixes the value only for that particular time and place. In the absence of the evidence from actual sales, we are unable to state exactly what the value of anything is. If for any purpose it becomes nevertheless necessary to assign a value, we must make an estimate, based on all available evidence, of what the value probably is. This is an appraisal. An appraisal is always an act of human judgment and sub-

ject to a margin of error. No matter how carefully made it can never be more than an approximation.

There is some slight disagreement among economists as to the exact definition of some of the terms which I have used. The essential features of the economic principles which I have stated, however, may be found elaborated in any standard text book on economics or political economy. I can particularly recommend, for a clear and simple statement, Fisher's "Elementary Principles of Economics."

II. Private and Public Business.

What are the economic principles that may furnish a guide for determining whether a given rate or price charged for a commodity or service is reasonable? I believe the investigation of this question must start with the condition of private business and free competition, and then proceed to the public service enterprise enjoying more or less of a monopoly.

The fundamental legal distinction between the private business and the public service enterprise is that the owner of the latter has voluntarily dedicated his property to the service of the public. The chief result is in the matter of legal regulation. All business and all private property are subject to legislative restrictions within constitutional limits. But the property which has been dedicated by its owner to public use may be regulated in ways that are not permitted in the case of property privately used. For example, in the case of the public service enterprise the legislature may require that all persons who demand the service be served on uniform terms, 1796 and at reasonable rates. The legislature may prescribe the reasonable rates to be charged. These distinctions are matters of law, not of economics. Their economic significance is that the possibility or the fact of legal regulation of rates is a restriction upon the freedom of the public utility. This restriction introduces a new element in the determination of rates, as compared with the private business. It is a circumstance that must be taken into account in estimating the probable future earnings, and therefore the value of the enterprise.

III. Competition and Monopoly.

The real economic distinction between the ordinary private business and the public service enterprise is that the former is operating under competitive conditions whereas the latter is generally a monopoly or approaches a monopoly. The economic laws which determine price are somewhat different in the two cases. Under free competition a market price is determined by means of supply and demand, as has already been explained. A monopoly enjoys greater freedom in fixing its price. If actuated purely by economic motives, it will seek to fix a price which, in view of the conditions of cost and demand, will give it the maximum possible net earnings. This is the principle of charging what the traffic will bear.

Under competition the price tends to be just equal to the utility of the commodity or service to the last person who is induced to buy and less than its utility to all other purchasers. All those who do not purchase refrain because the price is greater than the utility of the commodity to them, that is, the price is equal to the marginal utility of the article.

1797 In like manner the market price of an article tends in the long run to equal its cost. The price cannot permanently be greater than cost. Otherwise new producers, attracted by the extra profits, would swell the supply and so bring down the price. The price cannot permanently be less than cost. Otherwise some producers would go out of business, and the lessened supply would raise the price till it covered the cost to those who remained.

Under such conditions we have the commodity or service furnished normally at a price equal to its cost and in quantity to supply the needs of all those to whom it is worth the cost. This is the result of natural economic laws, and the price so brought about must be admitted to be a reasonable price. It is in fact the only price possible, assuming the condition of competitive enterprise which is the foundation of the modern industrial system. The reasonableness of the competitive market price must be taken as axiomatic.

Where purely private business is conducted under conditions of free competition there is no occasion for legal regulation to enforce reasonable rates. Even in the case of a public service enterprise under like conditions there seems to be no necessity of such regulation, except for the sake of preventing unjust discrimination between customers. Assuming there is no such discrimination, the amount of the rate will be determined by economic laws and will be reasonable.

Public service enterprises, however, are normally monopolistic. There may be two or more companies competing for the service. But such competition is almost necessarily only partial, and the condition is generally one of unstable equilibrium, and apt
1798 to lead sooner or later to real monopoly. We may properly pass at once to the consideration of the public service monopoly. If the principles governing respectively competition and monopoly are clearly stated, their application to any intermediate condition of partial monopoly should not be difficult.

The monopoly, whether devoted to private or public use, will, as already stated, tend to fix its rate, if not restricted by the legislature, on the principle of charging what the traffic will bear. Rates so determined do not carry the presumption of reasonableness which attaches to competitive prices. What are the economic principles that may furnish a rule for testing the reasonableness of the rates charged by a public service monopoly?

I believe we should seek the answer by applying so far as possible the principles of competitive industry, making modifications where the absence of competition changes the conditions.

IV. Relation Between Value of the Business and Reasonable Rate.

As has been shown, the value of any article of wealth depends upon the service that it renders. The service of a business to its owner are the net earnings which it yields. This is a general statement, admitting of some exceptions. A business enterprise is sometimes used by its owner in part to furnish other satisfactions, such as the pride of possession, the love of power, the opportunity to carry out a broad policy of public service, etc. But however real these so-called sentimental services may be, they are rarely of great importance in determining the value of a large business. The fundamental thing is the net earnings.

1799 The earnings which determine the value of a business are all in the future. Past earnings have no direct effect. And the present is only an instant of time separating past and future. We may, by a sometimes permissible loose use of language, speak of present earnings meaning those covering a considerable period of time. But this period is, strictly speaking, part past and part future, and this fact must be recognized in any careful analysis. Earnings then are either past or future. The past earnings can have no effect on the value of the business. They have already been realized. If no future earnings are to be expected, the fact of large past earnings will give no value to an enterprise; for example, a used-up mine. Also the absence of past earnings will not reduce the value of an enterprise that promises large earnings in the future; for example, a forest that is just ready for cutting. The history of past earnings may, of course, be used as an indication of what earnings may be expected in the future. But this is no contradiction of the principle just stated.

The earnings being future, their amount, indeed their realization at all, is not certain. The future is all uncertain. The probability that any given event will occur varies from that which is most unlikely to that which is very likely, covering all the range between impossibility on the one side and certainty on the other. The future earnings, on which the value of a business depends, always involve the element of uncertainty, and always require an estimate of their probability in valuing them.

Being in the future, the value placed on business earnings is a discounted value. By the process of discount we obtain the present value of earnings that are more or less remote in the future.

1800 Summing up, we have the economic principle that the value of a business enterprise is normally the discounted value of all its expected future net earnings.

This principle has an important bearing on the problem of reasonable rates, although its application is just the reverse of that commonly assumed. The attempt has very generally been made in rate cases to find what is a reasonable rate by arguing from the value of the business. Such an argument is bound to be futile, since it goes contrary to the true relation between wealth and its services. The value of any capital instrument depends on the value of its product. The

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value of an orchard does not fix the value of the apples. Just the reverse. The value of a business does not determine the rate charged. On the contrary, the rate, being an important factor in determining earnings, is one of the chief determinants of the value of the business. And there is no difference here between the competitive business and the monopoly. In either case the rate to be charged affects the earnings, and the earnings determine the value. To say that a certain rate is reasonable because the value of the business is so-and-so involves reasoning in a circle, since that very rate is one of the factors that has fixed the present value of the business.

It will be worth while to examine further the considerations that indicate the value of such an enterprise as that of a large public service corporation. If the whole business were sold, we could say that the sale price represented the value. But such sales practically never occur. Instead we have the sale from time to time of shares of stock and bonds. If these sales are frequent and in considerable volume we have a market price of the securities, which, multiplied by their amount, may fairly represent the value of the enterprise. This is without doubt the most trustworthy expression of the value of such a business. Where sales of securities are few and irregular, this measure of value becomes less trustworthy, especially since the sale price may be affected by various extraneous and temporary considerations.

When the stock and bond measure of value is wanting, resort is had to various other bases. Appraisals are made, of various sorts. The cost of the physical property is estimated, or the amount of the investment, or the cost of reproducing the plant. To the tangible plant there may be added an estimate of the value of the intangible elements, such as franchise, good will, "going concern value"; etc.

All of these are attempts to arrive at a figure that represents the value of the concern. None is capable of reaching any exact result. A fairly close approximation is the best that can be hoped for. And very often the result is quite wide of the mark.

As a matter of fact, all such appraisals, with the exception of that based on market value of securities, must fail to show the real value, because they start from the wrong end. The cost of a plant is no proof of the value. Its value may be greater or far less than the cost. There is no precise relation between what has been invested in a business and its present value. Reproduction cost comes closer, but is no real measure of value. The thing that determines value is future net earnings. If earnings appear likely to be small, the larger cost of the plant will not give greater value. If large earnings are expected, the value will be determined accordingly, even though the cost of the plant was small. It is of course no denial of this principle to admit that cost may be one of the factors considered in estimating future net earnings, as for example in giving some indication of the probability of future competition.

It is a mistake to suppose that the value of a business can ever be stated exactly (except possibly at the instant when the entire business is sold). The value depends on future earnings, which are

uncertain. People speak often of "speculative values." As a matter of fact all values are speculative. The differences are of degree only. All that can be done is to make the most accurate estimate possible of the future earnings. For the purpose of this estimate, every possible factor must be considered as evidence. The character of the physical plant, the nature of the franchise, the future supply and prices of materials, the probabilities of the labor market, the probabilities of competition, either directly from rival concerns or from possible substitutes for the commodity or service that is to be sold, the probabilities of changing demand for the service rendered, depending for example on whether it satisfies a primary physical necessity or some secondary need, the general business conditions, and especially the condition of other businesses in which the local public is particularly interested, the stability of the community, not only economically, but politically and morally, the stability of the government and its willingness and power to protect property rights, the attitude of public opinion toward legal authority, the obligation of contract, and the ownership of property, all of these things, not only as they are now but as they

1803 promise to be in the future; these are the chief factors but by no means all the factors that must be considered by an investor who seeks to appraise the value of a business enterprise. All of these factors are more or less uncertain, and the judgment based upon them can only be an approximation. No two men would reach exactly the same conclusion. Any conclusion reached is subject to a margin of error, depending on the degree of uncertainty, small in some cases, as for example a United States government bond, very large in other cases, as for instance certain mining ventures. Moreover an estimate of value once reached has no permanency, since the factors on which it was based are subject to change. The value today is one thing. Tomorrow it may be quite different.

Enough has been said to show that there is no such thing as an exact statement of value (except in rare cases), that all statements of value are simply more or less accurate estimates based on a multitude of uncertain and fluctuating factors.

All of what has been said applies equally to the competitive private business and to the public service monopoly. The only important difference is that the greater legal regulation to which the public service enterprise must submit is an added circumstance to be taken into account in estimating future earnings and present value. The investor will have to take into account the probable character of the rate fixing body, the spirit of the courts, the probabilities of future legislative action, and even the state of political feeling, in order to arrive at a true estimate of the probable future earnings of the enterprise. This shows the fallacy of trying to base a

1804 reasonable rate upon the value of the property, when that very value is the result in part of rates fixed in the past or expected in the future, and will be changed as the result of a change in rates.

It follows that the value of a great public service business is something that can never be determined exactly (neglecting possible

rare exceptions) and that the various estimates, appraisals, etc., which may be made are only approximations to the real value and even then subject to continual change. It has been shown also that even if the value could be exactly determined, it could not logically serve as a basis for determining a reasonable rate, because the rate itself and the character of the rate regulation are factors affecting the value.

V. Relation Between Cost and Reasonable Rate.

1. Reasonable rate should tend to equal cost.—Under competition the price must tend to equal the cost. This is a sound principle to carry over to the public service corporation whose rates are determined by legal regulation instead of by competition. Requiring a company to furnish a service indefinitely at a rate below its cost is certainly unreasonable. Such a condition cannot exist permanently under free competition. For example, the corporation that undertakes to supply a city with gas is impelled by the same motives of profit as any producer in the competitive field. It has entered with the expectation of charging rates that will cover its costs, including at least the normal profits. If its rates are not regulated, it will make its own rates on the principle of charging what the traffic will bear; i. e., it will seek to make its profits the maximum, assuming that it follows a policy of far-sighted self interest.

1805 Whether it actually succeeds in making a profit depends on the success of the venture as in any competitive business. The public does not ordinarily give any guarantee of profit.

It may be that the company is unable to earn enough, by any system of charges, to cover its costs. This means that the service is not economically self-supporting; that it is not economically desirable. The people do not want the service enough to pay for its cost. The cost of the service is greater than its utility. In such a case nothing can be accomplished by legal regulation. If rates have been fixed at what the traffic will bear, either an increase or a decrease of rates will add still further to the discrepancy between costs and earnings. The only reasonable course is to allow the company to charge what the traffic will bear and get out of the situation the best it may, pocketing its losses.

On the dividing line we have the case where, by charging what the traffic will bear, the company can obtain earnings just sufficient to cover the cost of the enterprise. Such rates must be regarded as reasonable, since any other rate would cause the business to be done at a loss.

The only case where there is any occasion for the exercise of the legislative power to fix rates is that in which the business is capable of making earnings in excess of costs, including the normal profit as hereinbefore defined. Here then is room for the legal limitation of rates without causing the company to furnish its service at a loss. What is the relation between a reasonable rate and the cost of the service in this case?

It has been shown that in competitive business, the price tends

1806 normally to equal the cost. A condition of extra profits is temporary or exceptional. The same principle may be applied to the monopoly. In the long run, a reasonable rate should tend to equal the cost. A rate that produces a permanent excess profit, or a permanent loss, may generally be regarded as unreasonable.

2. Reasonable rate above or below cost.—It must be emphasized that the last statement applies only to normal conditions and to "the long run." It does not mean that each month or each year reasonable rates must be exactly equal to cost. That there shall be from time to time extra profits or losses is inevitable. An exact equilibrium between rates and costs is not possible, on account of the many changing factors that affect both costs and earnings. Such extra profits and losses result inevitably from the operation of economic laws in private business. They could not be prevented by any system of legal regulation affecting the rates of public utilities.

This is true of competitive business. It is only in the broad view, in the long run, or (speaking somewhat loosely) on the average, that price is equal to cost. Large extra profits frequently appear in competitive business. So also do large losses. These tend, in a rough sort of way, to offset each other.

There are, I think, three main causes of a temporary excess of price over cost, which may be called (1) hazards of the business, (2) improvements in the arts, and (3) peculiar skill or zeal on the part of the owner.

(1) Business hazards.—All business contains the element of risk, of uncertainty as to future costs and earnings. All business 1807 is speculative, in greater or less degree. This being the case no business man, in setting his prices and planning his enterprise can be sure that he will recover his costs. Absolute guarantee of that would be enough to induce him to enter the field. In the absence of such guarantee, he knows that he may suffer loss. It is only because he believes that he may also gain extra profits that he is willing to take the risk of loss. Competitive business allows him the extra profits, if they arise. But any such extra profits will be only temporary. When once firmly established, competition will come in to reduce his earnings to cost. The temporary extra profit which he may hope to secure before competition wipes it out, is what leads the enterpriser to risk his capital and energies. Regulation that said that rates must never exceed costs, that extra profits may never be grasped, would mean that the enterpriser would see everything to lose and nothing to gain. There would be no inducement to engage in the business. He would put his capital into government bonds and give his personal services to an employer for a fixed salary. In the absence of any promise of extra profits, men will embark in business only if guaranteed against loss.

(2) Improvement in the arts.—A second reason for the necessity of occasional temporary extra profits is to encourage invention and improvement. Under competitive conditions the business man con-

stantly seeks to improve his plant, to perfect his organization and to discover new devices for decreasing cost, because he hopes by these means to increase his profits. He counts on receiving for himself any extra profits thus resulting. That it is in the public interest to thus encourage invention is recognized by the legislature in the granting of patents. The patent gives the owner a temporary monopoly in the extra profits of invention. It is true that the owner's extra profits, whether protected by patent or not, are only temporary. Before long his improvement will become the common possession of his competitors, and his peculiar reward will cease. But this temporary reward is enough to stimulate invention. Its lack would take away all inducement to improvement. The public may begin to gain from an invention even before it becomes the common property of all producers. The original owner often finds that the best use he can make of his improvement is to lower his price and increase his sales. Eventually all improvement tends to lower prices and better service and this benefits the consuming public. The price thus paid by the public for invention and improvement is a reasonable one. The public avoids the risk of loss in experiment. In the long run the public reaps the benefit of improvement. The temporary extra profit allowed the successful enterpriser is reasonable, because it is the necessary price that must be paid for progress, the chief benefit of which goes to the public.

(3) Special skill or zeal on the part of the owner may result in lowering his cost and so giving him an extra profit. The market price is determined by the cost of the marginal producer; that is, the least efficient one whose contribution is needed to supply the demand. Other producers, whose superior skill and special efforts reduce their own costs reap an extra profit. This profit is reasonable.

It takes nothing from the purchasers of the product. To deny it would simply cause the special skill and effort to be withdrawn, with no gain to the consumers. Moreover, the public has an interest in encouraging such special skill and zeal. Even here the benefit tends to be divided with the public. Sooner or later special skill tends to become more general. The more skillful owners increase their output. The less skillful producers on the margin are forced out, and the competition of those remaining tends to reduce prices. The extra profit that comes to the owner in return for special skill and effort is therefore reasonable and of advantage to the consuming public.

These principles may be applied also to the public service enterprise in a monopoly position. The same element of risk is here. The same promise of extra profit must be held out as an inducement to accept the risk of loss. No more than in competitive business can enterprisers be asked to risk their capital and give up their time and energies without some corresponding chance of extra profits. Also the public has the same interest in invention, improvement, superior management, and special effort. These things are to be secured by the motive of self interest, the same as in competitive business. The inducement of an extra profit is perhaps even more necessary in this

case, because the spur of competition is lacking. To forbid the public utility company some extra profit as a reward for invention, superior organization, and zeal would cause stagnation and deprive the consuming public of the benefit of advancement in the arts and of superior service. As a result rates would in the long run be higher than they need be.

1810 A reasonable rate will therefore allow extra profits from time to time, if such extra profits are the result of invention, improvement in plant and equipment, superior organization, special energy and zeal in management, or even good fortune. Such extra profits may continue for a reasonable time without being any evidence that the rates are unreasonable. Ultimately, however, the benefit of invention and improvement should go to the consumer through a lowering of rate back to cost. A condition of long continued extra profits not apparently due to any improvement or superior management within fairly recent times would be a fair ground for believing the rate to be excessive and unreasonable. Moderate extra profits evidently due solely to superior skill of management or special zeal of the owner might continue indefinitely so long as the cause continued, without furnishing grounds for declaring the rate unreasonable.

On the reverse side, a public service corporation may suffer losses, through poor management, bad judgment, etc., or through accidents and changed conditions over which its owners had no control. The company is not guaranteed against such losses. The fact that for some considerable time service may be furnished at a loss is not necessarily evidence that the rate charged is unreasonably low. The consumers are under no obligation to make good losses due to poor management any more than they are entitled to the gain that comes from superior management. If, however, changed conditions over which the corporation had no control have rendered the existing rate unremunerative, the consumers must eventually pay more.

(It is assumed that the rate was lower than what the traffic 1811 would bear and that the changed conditions have not made the service economically undesirable.) For a time the company must bear the loss. It must make every effort to adapt itself to the new condition and to see if the service cannot still be rendered at the old rate. Ultimately, however, a rate that is insufficient to cover the cost is unreasonable. Such a condition cannot remain permanently. The rate must be made high enough to equal the cost.

3. Classification of cost.—The term "cost" has been used as meaning all costs necessary to deliver the commodity in question at the market, including the normal profit necessary to induce the owner to devote his capital and energies to the business. It now becomes necessary to analyze more in detail the elements that make up cost.

The cost of furnishing a service or commodity to the public contains the following elements:

(1) Cost of operation;

(2) Cost of maintenance of plant and equipment;

(3) Cost of replacing property worn out, destroyed or abandoned because of obsolescence or inadequacy;

(4) Cost of developing the business as a going concern;

(5) Cost of creating and maintaining an efficient organization, cost of general oversight and management, cost of experiment, invention, etc., for the sake of taking advantage of improvements and progress in the arts, so far as these elements are not included in operating costs;

(6) A reasonable return on the capital necessary to the conduct of the business;

1812 (7) A reasonable reward for the labor of direction and oversight on the part of the owner, devoted to building up and maintaining an efficient enterprise.

These are all costs which must be covered by earnings; otherwise the business is being conducted at a loss, that is, at less than cost including the normal profit as hereinbefore defined. The problem of deciding upon a reasonable rate involves the determination, with a reasonable degree of accuracy, of the above elements of cost. For the most part, this is a technical problem in engineering and accounting and involves no serious question of economic principle. Some light may, however, be thrown upon the last two items by a consideration of certain economic principles.

4. Reward for labor of direction and oversight.—The last item in the elements of cost as stated is "a reasonable reward for the labor of direction and oversight on the part of the owner." Some allowance for this is obviously reasonable. The owner is giving something more than the mere capital necessary for the enterprise. He is devoting his time and thought to organizing and promoting the enterprise as an efficient business organization. If this oversight were withdrawn, the efficiency of the service would be impaired and the consuming public would suffer. By withdrawing it, the owner might direct it elsewhere and reap a reward for it. He is entitled to the same reward when devoting himself to the public service enterprise.

The determination of the exact amount of this reward must be a matter of judgment. There is no economic principle by
1813 which its exact amount can be determined, so far as I am aware. In my opinion the amount should properly bear some relation to the amount of the business done, measured, for example, by the gross earnings. Evidence as to what this ratio to gross earnings should be could probably be obtained from a comparative study of similar enterprises in which it is possible to segregate the value or the cost of this service.

5. Return on capital.—That a reasonable return on the capital devoted to the public service should be included in the cost is ob-

vious. Such return is expected and normally obtained in private business. There is no reason, in the nature of public service, why a similar return should not be allowed. It is required by justice to the owner no less than in private business. Moreover it is necessary, in the one case no less than the other, in order that private capital may be attracted into the business. And if the government should itself undertake the service it would have to pay interest on the necessary capital.

What is a reasonable return on capital? The only true guide is the rate which will attract the investors' capital in the amount needed for the efficient conduct of the business, assuming responsible management and honest accounting. If the rate allows less than this, the business will eventually suffer for lack of capital. If more is allowed, the consumers are paying a rate which is unnecessarily high and therefore unreasonable.

In the report of the Railroad Securities Commission to the President, dated December 11, 1911, 62nd Congress, Second Session, House of Representatives, Document No. 256, a statement is made which so very well expresses this matter and which is so very significant and true, in my opinion, that I should like to read it as representing my own opinion:

"What Constitutes a Reasonable Return.

"We hear much about a reasonable return on capital. A reasonable return is one which, under honest accounting and responsible management, will attract the amount of investors' money needed for the development of our railroad facilities. More than this is an unnecessary public burden; less than this means a check to railroad construction and to the development of traffic. Where the investment is secure, a reasonable return is a rate which approximates the rate of interest which prevails in other lines of industry. Where the future is uncertain, the investor demands, and is justified in demanding, a chance of added profit to compensate for his risk. We cannot secure the immense amount of capital needed unless we make profits and risks commensurate. If rates are going to be reduced whenever dividends exceed current rates of interest, investors will seek other fields where the hazard is less or the opportunity greater. In no event, can we expect railroads to be developed merely to pay their owners such a return as they could have obtained by the purchase of investment securities which do not involve the hazards of construction or the risks of operation."

The most difficult problem is to define the measure of the capital on which a fair return must be allowed. To attempt to use for this purpose the value of the business or even the value of the plant would involve us in the difficulties and inconsistencies that
1814 have already been pointed out in discussing the use of value as a basis for determining reasonable rate. These objections were, briefly, that the value can never be determined exactly and that it is itself a result of the rate charged.

Again, the historical cost of the enterprise or of the plant is not the correct basis. Some of the past investments may have been unwise. It is not reasonable to require the consumers to pay forever a return upon capital lost through mistakes of the owner. On the other hand some elements of the property, as for instance the land, may now be worth more than they cost, and the owner is entitled to a fair return on the enhanced value. A rival would have to acquire similar property, and the present owner could obtain the fair return by selling the property. That the owner of property devoted to the public service is entitled to the natural increase in the value follows from the analogy of private business. The owner of privately used property retains any increase that may come in its value, just as he bears any corresponding decline in value. The owner of property dedicated to public use is not guaranteed against a decline in its value. He is therefore entitled to any natural increase in value.

The logical method of determining the amount of capital on which the owner should receive a return is to assume a new company to enter the field in the place of the present one and to furnish from the start an entire new plant and organization capable of giving the present service. Or we may assume that the government itself should decide to dispense with the privately furnished service and to furnish the service itself. The cost of acquiring such a new
1815 plant and other necessary elements of the business may be estimated with a moderate degree of accuracy. This, I believe, represents the amount of capital which may fairly be taken as that on which a fair return should be allowed the owner of the present business in calculating a reasonable rate.

6. Depreciation in its relation to value and rate base.—An important and difficult question is whether the amount of necessary capital upon which interest is to be allowed as part of the costs of the business should include the plant at a sum representing the cost of a new plant or at such a sum less the accrued depreciation on the present plant. In general the question is whether a reasonable rate should include a return on the value of the plant new or in its existing state of depreciation. Although this question in various phases has caused some disagreement among economists, it is I believe capable of answer upon the basis of established economic principles.

In the first place, it must be recognized that the value of a new plant is greater than that of an old plant otherwise exactly similar, even though the old plant is being kept up by necessary repairs and renewals so as to give the same service as the new plant. That is, it is assumed that both plants are kept up to 100% efficiency indefinitely. How is it that two plants giving continually the same service can have different values? To answer this question we have to consider two cases. (1) Take the case of a single instrument which is capable of giving a certain service until it wears out, as for example a single steamboat, capable of giving a certain service for a certain number of years. When new the steamboat would be worth
1816 more than at any later time, even though its service was unimpaired, simply because the total amount of service to be expected from it is greater when new than at any later time.

The steamboat's value is depreciated, roughly by deducting from its value new such a part of that value as is represented by the ratio of its age to its total useful period. No one would dispute that a steamboat thus declines in value with age, and that the depreciation is based upon the decrease in the amount of its expected future services.

(2) The foregoing is the simplest case. Consider now the complex industrial plant, consisting of a multitude of elements, of various values and various life periods. Starting with the new plant, what happens as it grows old? It does not grow old and finally wear out as a whole. The separate parts wear out and are renewed at different times, repairs are made from time to time, and the plant as a whole is kept up to 100% efficiency and never wears out. Nevertheless it does grow old, and its value becomes less than when it was new. This will be clear if we consider that, with the exception of the land and possibly a few other durable elements, each of its parts has a limited life and must be eventually replaced, just as in the case of the steamboat. When the plant is new, all of its separate parts are new. This will never be true again. There will be some time before renewals will commence, and for a considerable time the renewals will be few. But gradually they will increase, as one part after another wears out, till finally the plant reaches an average state of normal depreciation, when we may say roughly that the average life expectancy of its various elements which are subject 1817 to wear is half their original expectancy. From this time the renewals will be fairly regular. But the service is still the same as that given by the new plant. How then can the value be less? The answer is that the cost of up-keep (repairs, renewals, etc.) must be charged against the service. And the cost of up-keep is greater for the old plant than for the new one. Assuming, for the sake of simplicity, that the business started as a developed going concern, the gross earnings will be the same for both plants, but the cost of replacements will be more for the old plant than for the new. The value of the old plant will therefore be less than the new. It will be depreciated.

It must be emphasized that the only way that the value of such an old plant could be exactly determined is by an actual sale. Such a sale of an entire plant separated from the business of which it is a part is rare. Still if it should occur, it would certainly show a less value for an old than for a new plant, and the difference would represent accurately the joint estimate of buyer and seller of the amount of the depreciation. The value of an old plant is therefore really less than that of the new one by the amount of the depreciation. It must be remembered, however, that in the absence of an actual sale, an exact statement of the value or of the amount of the depreciation cannot be obtained. The market value of securities, even if the sales were frequent and regular enough, would not show it, since they represent the value of the whole business as a going concern, which includes a good many elements beside the value of the physical plant. Now if it is necessary to have a statement representing the value of

the plant, the best that can be done is to obtain an approximate statement by means of an appraisal of the plant. The correct way to do this is undoubtedly to estimate the reproduction cost (or better the cost of a new plant of the best and most economical type that could at present be put up to do the same service) and then deduct the estimated depreciation on the old plant. All of this involves judgment as to a host of doubtful factors, and there is a wide margin of error. The result will be as close an approximation to value as can be obtained under the circumstances.

Whether this amount (this estimate of value) is the correct amount upon which to allow a return for the capital invested in a public utility enterprise is another question. We need to distinguish always between value (in its scientific sense) and a rate base. The fact that there is a close analogy between the two and that value is a convenient term to use, has often led to an assumption (perhaps unconscious) that a certain capital amount which has been set up as a rate base is therefore the value, or that the value is necessarily the only correct rate base. Neither of these suppositions is true.

The man who puts capital into a private business enterprise expects the business to earn enough to cover all its costs, including a fair return on the capital, while at the same time maintaining the capital intact or else returning it to him in payments over and above the normal return on capital. (Keeping the capital intact does not of course involve any guarantee against price changes). Unless he expected this much, he would not invest. And he is allowed to have this, if he can get it. I think it may be taken for granted that the investor in a public service enterprise is entitled to the same terms.

Starting with this assumption, I believe it is possible to deduce from economic principles the correct statement of the capital invested in the business to serve as a rate base. It must be remembered that I am not speaking of a rate base which shall finally and by itself determine a reasonable rate. I am concerned with the amount of capital upon which a reasonable return shall be included as part of the necessary costs of the service rendered by the enterprise. This I have defined as the actual cost, appraised as accurately as possible, of a new concern capable of furnishing the present service. This cost will include cost of the physical plant, necessary working capital and all other costs necessary to the establishment of the business.

The important question of economic theory involved is whether the sum assigned to the plant should be the cost of a new plant or that cost reduced by the amount of accrued depreciation on the existing plant.

Let us assume that a given plant at the beginning is made up of various elements, all new, whose value and duration of life are as follows:

A, will last n years
 B, " " m "
 C, " " p "
 etc.
 K, " " forever (land, etc.)

Total, P . P is the cost and therefore may fairly be assumed to be the value of the entire plant, new. From now on we may neglect the durable elements (as K), except that they are always included in the total (P).

Suppose that from the beginning there is set aside annually in a depreciation reserve a certain sum for each element of the 1820 plant which is subject to wear, so that these sums with accumulated interest will be sufficient to replace the element when it wears out. This is of course the sinking fund principle. Let the respective annual contributions for depreciation be as follows:

For A, a
 " B, b
 " C, c
 etc.

 " P, d .

Let the amounts of the depreciation reserves for the respective parts of the plant after any given period of time (t) be a_t, b_t, c_t , etc., and the corresponding total depreciation reserve be d_t . Let the depreciated values of the various parts of the plant and of the whole plant after any given period of time be A_t, B_t, C_t , etc., and P_t . Then, assuming that there are no changes in capacity or in prices, let it be assumed that

$A_t + a_t = A$
 $B_t + b_t = B$
 $C_t + c_t = C$

 $P_t + d_t = P$

That is, the original value of any part of the plant or of the whole plant is at any time equal to the sum of the present value and the depreciation reserve.

Let it be assumed that all renewals of plant are deducted from the depreciation reserve. Since the reserve is built up from the beginning when the entire plant is new, and the renewals are small for the first years, the reserve will gradually accumulate and always be equal to the difference between the value of the plant when new and its present depreciated value.

A simplified balance sheet, taking account only of the items with which we are here concerned, would read as follows:

Assets.		Liabilities.	
Plant	P	Capital stock	P
Depreciation fund	d_t	Depreciation reserve	d_t
Total.....		Total.....	
$P + d_t$		$P + d_t$	

The plant is carried on the asset side at its original value. Its present value (P_t) is really $P - d_t$. Other assets have been accumulated equal in amount to the depreciation in the plant, d_t .

This reduces the problem to its simplest terms. Is the owner to be allowed a fair return upon P or upon $P - d_t$? If he is allowed a return on $P - d_t$ only, it means that he is not allowed a return on the assets which have been accumulated in the depreciation fund to make good the decline in value of the plant. But these assets with the compound interest upon them are pledged to the business in order to keep the capital intact and the service unimpaired. They are not free funds which the owner may use up, or the interest on which he may divert to other uses, without an impairment of the investment in the enterprise. The owner's investment in the business is of the same amount as at the beginning. The only difference is that, whereas in the beginning his capital was all in the form of plant, now it is part plant and part other assets in the depreciation fund. But the total amount is the same and the whole amount is still tied up in the business. The owner must still receive a fair re-

1822 turn on the whole amount; otherwise the investment will be impaired. In other words the correct rate base is the full undepreciated value of the plant.

It makes no difference in this conclusion what use is made of the depreciation fund. Three cases may be considered.

(1) The fund may be invested outside the business. The balance sheet would then read.

Assets.		Liabilities.	
Plant	P	Capital stock	P
Outside investments	d_t	Depreciation reserve	d_t
Total.....		Total.....	
$P + d_t$		$P + d_t$	

The sum d_t invested in outside securities is still necessary to keep the investment intact, and the return which it earns is necessary. Both principal and interest are tied up in the business. They cannot be otherwise used by the owner without impairing his capital. Not to allow the business to earn a return on this amount would mean that, although the entire original amount is still tied up in the business, the owner is permitted to earn a return on only a part of it. It must be remembered, of course, that I am assuming rates to

be fixed according to cost, and that the owner is not allowed to include in costs anything for renewals except his regular annual depreciation charge. A return must be allowed on the full undepreciated value of the plant.

(2) We may next assume that the depreciation fund is invested in the business itself, as, for instance, in increasing the plant. This situation can be shown most clearly by first supposing that 1823 the amount of the new capital (cost of new plant) is borrowed by means of a bond issue. Let the cost of the new plant be represented by P' . Conditions being otherwise as in (1), the balance sheet would read thus:

Assets.		Liabilities.	
Plant	$P + P'$	Capital stock	P
Outside investments	d_t	Bonds	P'
		Depreciation reserve	d_t
	<hr/>		<hr/>
	$P + P' + d_t$		$P + P' + d_t$

The investment of capital in the business is now greater than in the previous case by the amount of the new plant, P' . A return must be earned by this additional capital just as necessarily as the capital represented by the original plant. The necessity of allowing a return on the full undepreciated value of the old plant is in no way altered. Hence a reasonable rate must allow a return on the value of the original plant and on the new plant, or on the total undepreciated plant ($P + P'$). That is, a return must be earned on all assets which are actually and necessarily used in the business and at their undepreciated value. Of course this illustration would be unchanged, if additional stock had been issued instead of bonds.

Now suppose that the amount of the depreciation fund, being just enough to furnish the cost of the addition to the plant ($d_t = P'$) is invested in the business itself in the form of addition to plant. This makes it unnecessary to obtain the money by issue of bonds or stock. The balance sheet would then read:

1824 Assets.		Liabilities.	
Plant	$P + P'$	Capital stock	P
		Depreciation reserve	d_t
	<hr/>		<hr/>
	$P + P'$		$P + d_t$

The outside investments have been sold and new plant bought with the proceeds. The owner thereby avoids the necessity of paying interest on bonds, but the depreciation fund loses the income formerly derived from the outside investments. Disregarding possible differences in the rate of interest, these amounts balance each other. Out of the earnings of the business the owner must now set aside a sum equal to the interest on the depreciation reserve at the rate assumed in its calculation. This he can do without impairing

his investment, only if the business earns the normal return on the full undepreciated value of the plant. It is true that the rate of return allowed on the investment may be greater than the rate of interest at which the depreciation reserve was calculated, leaving an apparent excess as clear gain to the owner. This is not a real excess however. The depreciation reserve was based on a low rate of interest, on the assumption of investment in a form subject to slight risk only. When thus invested in outside securities the integrity of the depreciation fund was virtually assured. Investment in the business places upon the owner the obligation of insuring the integrity of the depreciation fund although it is now subject to all the hazards of the business. The extra rate of return is therefore just sufficient to compensate for this extra risk.

A return must therefore be allowed on the undepreciated value of the entire plant, no matter whether the cost of the new plant 1825 was obtained by a bond issue or by the use of the depreciation fund. Otherwise the owner would not be receiving interest on his entire investment, and he could simply continue to invest the depreciation fund outside and obtain funds for extension of plant by means of bonds or an additional issue of stock, on either of which a return would be allowed without question. It follows that a return must be allowed on the depreciation fund, even though that fund is invested in the business and as such counted in the capital invested. A return must be allowed on the entire undepreciated plant.

(3) Now let it be assumed that the owner has kept no depreciation reserve, but has made the necessary renewals as their need occurred and received back in extra earnings the amounts that represent the depreciated value of the plant. It is assumed that the rate regulation determined earnings and not dividends, so that this option was open to him. The rates were sufficient to allow a proper depreciation charge, but the owner has chosen to take in extra dividends the amount in excess of actual renewal costs. The plant has of course been kept up to full efficiency.

Assuming the facts as in case (1), the balance sheet will read as follows:

Assets.	Liabilities.
Plant	P Capital stock.....

Of course the plant is depreciated by the amount d_t and is really worth $P - d_t$ or P_t . Nevertheless the business must still be allowed to earn a return on the full value of the plant undepreciated. The

funds taken out by the owner were not a return of part of 1826 his investment over and above the normal return upon it.

On the contrary these funds and their accumulated interest will always be necessary to make good the depreciation on the plant and preserve the investment intact. If instead of holding them for that purpose, the owner chooses to dissipate them, that is his option. But the business will still owe him a return on the full amount of

the capital, undepreciated. The owner, on the other hand, now has a responsibility to the business. He must make replacements when needed, so far as they may ever exceed the allowed annual depreciation charge. And he is responsible for ultimately returning to the business the amount of the depreciation fund with accumulated interest, if the capital is to be made intact. In a sense the owner is indebted to the business for the amount of the depreciation fund. The owner is only getting the normal return on his capital. If we imagine the plant to be sold at a future time, the amount received, being the depreciated value, P_t , will, when increased by the depreciation fund with all its accumulated interest, d_t , just equal the value of the plant-new, and the owner has received beyond this nothing but the normal return on the capital. It follows that even though there be no depreciation reserve, a reasonable rate must permit interest on the full value of the plant without depreciation.

All of the foregoing is on the assumption that the allowed costs include only a normal rate of return on the capital and that all that is allowed for renewals is the regular annual charge for depreciation based on the sinking fund principle. If depreciation had been charged on the straight line principle, the result would be
 1827 different: Then the depreciation fund, necessary to make good depreciation of the plant, need consist only of the sum of the annual contributions to it. It does not need the interest on such contributions. The depreciation fund may be invested outside and the return used up without impairing the capital, so long as only the principal sum is kept intact. In this case a rate is reasonable that allows a return on the depreciated value of the plant only. The return on the depreciation fund will make good for the lack of return on the difference between the value of the plant new and its depreciated value.

I am convinced that the interest of the public is not in seeing that a certain depreciation fund is maintained, but rather in seeing that the service is maintained unimpaired; but if the service is thus maintained unimpaired the public is not concerned with the financial operations of the company to the extent of needing to regulate the amount of reserve that is carried for depreciation. The interest of the public is that the plant be kept up to the full 100% efficiency in order that the service may not be impaired; that also, in the long run, is to the interest of the owner. In general the way in which he accomplishes that may fairly be left to his intelligent self-interest. If you assume that the owner is so reckless and careless that he has used up funds which should have been kept in reserve and finally becomes unable to maintain the service, then the public has been injured; but then the rate base on which a return should be calculated should be reduced to the amount of capital necessary for furnishing the reduced service, which is all that is now being given; so that the owner would then be punished for his inability to
 1828 maintain the service intact; in other words, the owner is responsible to the public for maintaining the service and the public has the right to demand unimpaired service. So long as he lives up to that responsibility the exact financial details according

to which he manages his reserves are not a matter, I believe, of direct concern to the public and need not be taken into account in determining a reasonable rate.

The foregoing is a theoretical analysis which has assumed, for the sake of simplicity, that there has been legal rate regulation, with a definite allowance for depreciation, from the beginning, when the plant was new. The conclusions reached hold good for present rate regulation looking to the future. In fact, I am convinced that (ignoring possible extremely exceptional cases) the correct rate base for use in determining reasonable rates is the undepreciated cost of a new plant capable of performing the service now performed by the present plant, without regard to the past history of the business. It is true that a theoretical situation could be assumed in which justice would require taking account of past earnings in determining a reasonable rate for the future. But in view of the impossibility of ever meeting such a situation in actual fact, such an assumption has little practical value. As a matter of practical administration it would never be possible to make a fair adjustment between the past and the future. If earnings in the past have been too low, whether brought about by economic conditions or by rate regulation, no one would propose to make good the loss by permitting higher rates in the future. If past earnings have been greater than an assumed normal return, in the absence of legal regulation, or even

because past regulation has been too liberal, it is not practicable to make an adjustment by reducing rates for the future. Even if practicable, this would be unjust. The investors who received the past earnings are not necessarily the same ones who are to receive the earnings of the future. Neither are the consumers the same. There is no reasonableness in punishing one set of investors for the good fortune of another set or rewarding one group of consumers for the hardships of another group. The only practicable rule is to consider the past as past, and as quickly as possible introduce the correct procedure for the future.

The same conclusion may be reached from a different starting point. A competitor who should enter the business would have to invest capital sufficient to pay the cost of a new plant. Under competitive conditions, new concerns enter the field with an investment including the cost of a new plant. They expect their earnings to include a fair return on the cost of the new plant. Yet competition compels them to accept the same rate as is received by those already in the business using old plants. Under competition there is no difference in rate based on differences of age or depreciation in the different plants. The same principle holds good of a monopoly public service enterprise, the competitor being in this case hypothetical. If a competitor should enter the field he would have to invest the cost of a new plant. If the Government itself (always a potential competitor of the public utility) should decide to go into the business it would have to put up the cost of a new plant. For the same service the rate should be the same, whether furnished by an old plant or a new one.

1830 I have in all this statement been considering the matter of depreciation from the side of cost, that is from the side of the producer, which is the side on which its consideration properly belongs. From the consumer's side, it is immaterial whether the plant is new or old so long as the service is the same. The consumer is not concerned with depreciation in plant so long as there is no deterioration in service. His only concern in this particular matter is that the rate be normally no higher than cost, which puts the consideration of depreciation in the treatment of cost, where it belongs.

7. Obsolescence.—In discussing depreciation, I have assumed that deterioration from wear will be taken care of by setting aside, from the beginning of the life of each element of the plant, annual sums which, with accrued interest will be sufficient to replace the instrument when it wears out. I have assumed that this depreciation fund was not intended to provide for renewal of plant abandoned on account of obsolescence.

An instrument becomes obsolete when it becomes advantageous to abandon it and substitute a new instrument, even though the old one is still capable of giving service as before. The advantage in the change is due to the expectation that the new instrument will be more efficient, either in improving the service or diminishing the cost, or both. Obsolescence should, I believe, be a charge upon the future rather than upon the past; that is, the cost of amortizing plant abandoned by reason of obsolescence should be provided, not by building up a reserve during the lifetime of the old plant, as in the case of depreciation, but rather by making the new plant earn enough to amortize the value lost by abandoning the old

1831 plant which it displaced. Obsolescence is not a predictable thing, like depreciation. Moreover its economic nature is different. The introduction of a new device means an ultimate reduction of cost or improvement of service. Otherwise it would not be made. The new device should bear the cost of its own introduction, before it can truly be called worth while, that is its earnings should make good the loss on the old device which it rendered obsolete. Moreover the cost of obsolescence should be borne by the consumers who are served by the new device and therefore receive the advantage of the change. The past consumers get no advantage from the change and it is unreasonable that they should bear an additional charge on account of it. For these reasons I believe that the cost of abandoning obsolete property should be included in the rate charged after the property has been abandoned instead of including it in the previous rate by means of a reserve for obsolescence.

8. Summary.—Summing up the relation between reasonable rate and cost: (1) A service is economically undesirable when, under intelligent and far-sighted management, charging what the traffic will bear will not yield revenue sufficient to cover the cost. In such a case rates determined by charging what the traffic will bear are reasonable. (2) In the case of an economically desirable service, a reasonable rate will tend in the long run to be equal to the cost of

the service. (3) From time to time, however, a reasonable rate may be either above or below the cost. This is because the consuming public does not guarantee the public utility company against loss, and on the other hand must allow it the chance of extra profit as a reward for taking risk and an inducement to improvement, superior management, and special zeal. (4) Cost includes a reasonable reward for the labor of direction and oversight on the part of the owner. (5) Cost includes a reasonable return on the capital necessary to the conduct of the business, measured by the present cost of establishing a new enterprise capable of furnishing the service. (6) In thus estimating the amount of necessary capital the cost of the new plant should be taken at its full amount without any deduction for depreciation on the existing plant.

VI. Relation Between Utility and Reasonable Rate.

The problem of reasonable rate has to be approached from two sides. (1) From the point of view of the producer. This led to the consideration of cost. (2) From the point of view of the consumer. This leads to the study of the utility of the service in its relation to a reasonable rate.

It has been shown that under competitive conditions, the market price tends to equal the marginal utility of the commodity or service; that is, the marginal utility to the last purchaser, to whom the thing is just worth what it costs. Other purchasers have bought the article for less than its utility to them. Others, who have not purchased, would be induced to purchase if the price were lowered to their own estimate of the utility. No change in this respect comes when we pass over to the monopolistic public service company. The monopoly is on the supply side, and therefore affects the consideration of cost. But utility relates to the demand side of the market, and there is no monopoly among the consumers of a public utility company nor any compulsion upon them to purchase the service. For example, 1833 whatever the rate charged by a local monopoly for gas, the utility of the gas is at least equal to the price to all its consumers, from the very fact that they purchase it. To all others the fact that they refrain from purchasing is evidence that the price exceeds the utility.

On the other hand, the price charged by a monopoly is not automatically fixed at cost by supply and demand, as under competition. The principle of monopoly price is charging what the traffic will bear, which may result in a price above cost and yielding a margin of profit above a normal return on the investment. The statement that the price is equal to the marginal utility of the commodity sold is therefore little more than a truism and gets us nowhere in the inquiry as to what is a reasonable rate. The important thing here is not the marginal utility, but the total utility of all the product sold. This obviously increases with the quantity sold, and therefore varies inversely with the price. A monopoly may set a high rate, sell a small quantity, and so satisfy the wants of only a

few consumers. The total utility furnished is small. On the other hand, a low price means a large utility furnished to consumers.

It is also important to consider what is known as the "consumers' surplus." Every purchaser except the marginal one is getting the product for a price somewhat less than he would be willing to pay rather than go without; that is, the price he pays is less than the utility to him. This difference, due to the fact that the price is set at the marginal utility of the product, is his consumer's surplus. The sum of all such individual surpluses is the total consumers' surplus, which is very large for a commodity of wide use and low price.

1834 The matter of substitutes, whether real or potential, is an important element in utility. The utility of a product cannot be greater than the price of a substitute that could supply the same want. If gas is sold at 85 cents, whereas the price of coal or oil sufficient to supply the same want is 90 cents, the consumers' surplus cannot be over 5 cents. If the price of coal and oil are much higher, the consumers' surplus and the total utility of gas are so much the greater.

The investigation of reasonable rate from the side of utility involves the question of how much is being given the consumer: Is he getting much or little for his money? In seeking an answer to this question, a number of lines of investigation are open.

(1) How wide spread is the use of the service? A narrow use by a few people, presumably the wealthier ones, means a small total utility and a small consumers' surplus. The company is not giving much to the consumers. A wide use, extending to the poorer people, means a large utility and a large consumers' surplus. One important cause of small sales is apt to be a high price, and widespread sales are possible only with a relatively low price. The amount of service given, as measured by sales, is therefore an indication of the reasonableness or unreasonableness of the rate. It can, of course, never be conclusive proof apart from the consideration of cost. This matter of the amount and extent of the service is particularly important in dealing with commodities or services of general use or necessity, such as the public service enterprise usually deals in.

1835 (2) Is the service increasing or decreasing? The answer to this question will be evidence as to the utility of the service and the reasonableness of the rate. This follows from the reasoning just given under (1).

(3) Is the service extending to new uses and new classes of consumers? An affirmative answer indicates a growing utility and that the utility of the service is recognized by the consumers, and is thus evidence as to the reasonableness of the rate.

(4) Is the community growing, and in particular is the growth due to the influx of enterprises that make use of the service in question? If the service is a necessity or approximately so, the growth of the community may be taken as indirect evidence that the service is regarded as satisfactory and the price reasonable. On the other

hand, it might be shown that the growth of the community was being retarded because of unsatisfactory service and a high rate. This line of evidence is, of course, of special importance if the growth or lack of growth is among consumers who are especially dependent on the particular service in question.

(5) How does the utility of the service compare with that of substitutes? It should be remembered that, even though the producer has a monopoly of the sale of the commodity in question, there is still competition of substitutes. Some competition is actual and present. Other is potential, waiting only for the time when the rate charged is too much out of harmony with the utility of the commodity. If the utility obtained by a certain expenditure for the service in question is much greater than could be obtained from the same expenditure upon any substitute, this fact is evidence
1836 tending to show great utility and hence a reasonable rate. If the service in question is extending into fields formerly occupied by other articles, the fact tends to show a reasonable rate, on the ground that the utility of the commodity is greater than that of possible substitutes. For example, if gas is being used where coal or oil were formerly used, there is an indication that the rate is reasonably in harmony with utility.

(6) How does the particular rate compare with the rates charged for similar service in other communities? This inquiry must of course take into account all the circumstances in the localities compared which would have a bearing on the comparative rates. This comparison is especially important if made with other places where rates have been fixed by legislative action, since it may be presumed that the rates in such places are reasonable in the opinion of their rate fixing authorities. Such an inquiry may give useful evidence as to the reasonableness of a rate.

(7) How does the rate charged compare with the prices of other commodities and services of wide spread use? If there is a general trend of the prices of most articles of common use either up or down, this must be due to some general cause affecting all in the same way, as for instance a change in the value of the monetary standard. If now the rate of the commodity in question tends to move in harmony with the general price level, this evidence is neutral as to reasonableness. If the particular rate is increasing while other prices are decreasing, this fact might indicate an unreasonable rate. If, on the other hand, the rate in question is decreasing or stationary in
1837 the face of a general increase in prices, or is increasing at a slower rate than other prices, this fact would tend to indicate that the rate was reasonable so far as the consumers were concerned. It might indicate an unreasonable rate to the producer, but that would be a matter of cost rather than of utility.

(8) Some evidence may be obtained from a study of the intrinsic quality of the commodity or service. If the service is of high quality and improving, the fact will at least tend to strengthen the conclusion that the rates are not too high. Inferior and deteriorating

service on the other hand would strengthen the argument that the rate was unreasonable in view of the utility of the service.

(9) What is the consensus of opinion among the consumers? Is the prevailing attitude one of dissatisfaction with the service; are complaints frequent? Or is there general acquiescence in the excellence of the service and the reasonableness of the rate? The answer to these questions will tend to show whether the general run of consumers are satisfied that they are getting their money's worth. The opinions of consumers should have weight in determining whether a rate is reasonable.

This list is not necessarily inclusive. There are doubtless other lines of inquiry which would produce evidence as to the utility of the service and so the reasonableness of the rate.

It must be emphasized that since a reasonable rate must tend in the long run to equal the cost of the service, any amount of evidence from the side of utility alone would not determine the reasonableness of the rate. Both cost and utility must be considered.

1838

VII. Summary.

The main conclusions of the foregoing statement may be summarized briefly as follows:

(1) The value of any commodity or service is the amount of any other good for which it will be exchanged and in general is the result of its utility and its cost of production. When there is a regular competitive market, value is determined by supply and demand, as a result of which a market price is fixed equal both to the marginal utility and to the marginal cost of the good.

(2) The ordinary public service enterprise differs from the private business mainly in two respects: (a) on the legal side, it is subject to greater regulation, particularly as to the rates which it may charge; (b) on the economic side, it is apt to be a monopoly or approach more or less closely to monopoly condition. The problem of determining reasonable rates for public utility enterprises has been investigated by starting with the recognized economic principles that govern rates in private competitive business and carrying these principles over to the public service monopoly.

(3) Value of a Business Enterprise.—I have shown that the value of a business enterprise is normally the discounted value of all its expected future net earnings. The future being always more or less uncertain, the value depends on an act of human judgment in estimating future earnings. Except when determined by an actual sale of the whole business, it is not possible to state exactly the value of a business enterprise. If incorporated and having its securities exchanged frequently and in large volume on a regular market, the market value of the securities gives the best indication of the value of the business.

1839

Otherwise an appraisal of some sort must be made, which is always an act of judgment and subject to a considerable margin of error.

(4) Value of the Business and Reasonable Rate.—The value of a business cannot be used as a basis for determining a reasonable rate, because this involves reasoning in a circle. The value of the business itself depends in large part on the rate, since the rate is one of the chiefs factors that determine net earnings. It is the rate that determines the value of the business, not the value of the business that determines the rate.

(5) Cost and Reasonable Rate.—(a) A reasonable rate should tend normally and in the long run to equal the cost of the service, cost being defined to include a fair return on the capital and a fair reward for the labor of the owner in directing the business. This follows from the principles governing competitive rates, which are normally fixed at cost by the action of natural economic laws, whose results must be admitted to be reasonable (this is disregarding unreasonable discrimination between consumers).

(b) The foregoing principle holds only for normal conditions and in the long run. From time to time a reasonable rate may give profits in excess of a normal return on the capital. This occurs in competitive private business and is likewise reasonable and necessary in the business of a public service monopoly, as a reward for assuming the hazards of the business and as an inducement to improvements, superior organization, and special zeal on the part of the owner, from all of which the chief benefit ultimately goes to the consuming public. Conversely a reasonable rate may from time to time be temporarily insufficient to cover the cost of the service.

(c) Fair Return on Capital.—The necessary costs of a business include a fair return on the capital necessary to the efficient performance of the service. In determining the amount of this necessary capital, it is a rate-base that is being sought, which is not ordinarily the same as the value of the business or the value of the plant. The most trustworthy measure is the cost of establishing a complete new enterprise of the most modern and economical character capable of furnishing the service given by the existing enterprise.

(d) Depreciation.—This cost should be taken at its full amount, not reduced on account of depreciation in the existing plant. This is necessary in order that the business may pay its costs, make a fair return on the capital invested, and maintain the investment unimpaired.

(e) Obsolescence.—The cost of property abandoned on account of obsolescence should be amortized by charging sufficiently high rates for this purpose after the new plant has been installed, and not by setting up an obsolescence reserve before the change.

(6) Utility and Reasonable Rate.—In studying the utility of the service we are approaching the problem of reasonable rate from the

point of view of the consumer. The total utility and the "consumers' surplus" utility both vary inversely with the rate and have therefore an important bearing on the reasonableness of the 1841 rate. The question is whether the consumer is getting much or little for his money. In seeking to answer this question the following lines of investigation should be taken: (a) How widespread is the use of the service? (b) Is the service increasing or decreasing? (c) Is the service extending to new uses and new classes of consumers? (d) Is the community growing, in particular among consumers especially dependent on this service? (e) How does the utility of the service compare with that of substitutes? (f) How does the rate compare with the rates charged for similar service in other communities? (g) How does the rate charged compare with the prices of other commodities and services of wide spread use? (h) What is the intrinsic quality of the service, and is it improving or deteriorating? (i) What is the consensus of opinion among the consumers as to the quality of the service and the reasonableness of the rate?

7. Judgment as to the reasonableness of a rate should be based on the facts regarding both cost and utility.

1842

SUBDIVISION IX.

Evidence Relating to Divers Transactions Whereby the Gas Properties in San Francisco Ultimately Came Into the Ownership of the Plaintiff.

MR. CHAS. L. BARRETT, a witness recalled for the plaintiff, testified in substance as follows:

I have been in the service of the San Francisco Gas Light Company and its successors, the San Francisco Gas and Electric Company and the Pacific Gas and Electric Company, almost continuously since 1876.

San Francisco Gas Company, 1852 to 1873.

The first company to engage in the manufacture and distribution of gas in San Francisco was the San Francisco Gas Company which was incorporated August 31, 1852. Between 1852 and 1870 two other gas companies, known as the Aubin Gas Company and the Citizens Gas Company, were organized and commenced to do business in San Francisco. The last two companies, however, sold their properties to the San Francisco Gas Company prior to 1870.

In 1870 and 1871 the City Gas Company and the Metropolitan Gas Company were organized and engaged in business in competition with the San Francisco Gas Company.

San Francisco Gas Light Company, April, 1873, to January, 1897.

In the month of March, 1873, the San Francisco Gas Light Company was incorporated and on or about April 1, 1873, acquired all of the gas manufacturing plants and distribution systems which were owned at that time by San Francisco Gas Company, City Gas Company and Metropolitan Gas Company. In consideration of the transfer to it of the aforesaid properties, the San Francisco Gas Light Company issued its entire capital stock, to-wit, 100,000 shares of the par value of \$100.00 each. The San Francisco Gas Light Company continued in business without increasing its capital stock or issuing new bonds until January, 1897.

Most of the books and records of the San Francisco Gas Light Company were destroyed in the earthquake and fire of April, 1906. Among the books and records of that company saved, however, was a book containing statistics with reference to its business and financial operations from 1873 to 1893 and a continuation of that book to some time in the year 1896. According to the book to which I have just referred the value of the properties and assets of the San Francisco Gas Light Company at April 1, 1893, the time when it issued its stock as aforesaid, was the sum of \$5,453,255.86. This record book to which I have referred shows additions to investments from year to year so that at the end of the year 1896 the assets of the San Francisco Gas Light Company, as shown by said books and a balance sheet at the end of 1896, amounted to the sum of \$8,725,608.08.

1844 San Francisco Gas and Electric Company, December, 1896, to December, 1911.

The San Francisco Gas and Electric Company was incorporated in the month of December, 1896. In January, 1897, the San Francisco Gas and Electric Company acquired by deed from Edison Light and Power Company the latter's electric properties in San Francisco. Also in January, 1897, the San Francisco Gas and Electric Company acquired all of the gas properties theretofore owned and operated by San Francisco Gas Light Company except certain non-operative lands and properties the book value of which, according to the books of the San Francisco Gas Light Company, was the sum of \$520,141.64. The San Francisco Gas Light Company had never engaged in any business other than the manufacture, distribution and sale of gas.

The San Francisco Gas and Electric Company, in payment for the properties which it acquired from the San Francisco Gas Light Company, issued to the latter 100,000 shares of its own capital stock of the par value of \$100.00 each which was the entire consideration for the property so acquired.

The San Francisco Gas and Electric Company, in payment for the electric properties which it acquired from Edison Light and Power Company in January, 1897, issued to the latter 27,500 shares

of its own capital stock of the par value of \$100.00 each and
 1845 assumed the obligation of paying the outstanding bonded
 indebtedness of said Edison Light and Power Company which
 at that time amounted to the principal sum of \$800,000.00 evidenced
 by bonds bearing interest at the rate of 6% per annum.

The San Francisco Gas and Electric Company acquired the gas
 properties and business of the Pacific Gas Improvement Company
 in September, 1903; the gas properties and business of the Equitable
 Gas Light Company in August, 1903; the gas properties and busi-
 ness of the Independent Gas and Power Company in November,
 1903; and the electric properties and business of the Independent
 Electric Light and Power Company in November, 1903. In pay-
 ment for the properties of the Pacific Gas Improvement Company,
 the San Francisco Gas and Electric Company issued to the Pacific
 Gas Improvement Company 28,000 shares of its own capital stock
 of the par value of \$100.00 each and assumed outstanding 4% bonds
 of the Pacific Gas Improvement Company of the aggregate par value
 of \$1,190,000.00.

For the properties of the Equitable Gas Light Company, the San
 Francisco Gas and Electric Company paid in money the sum of
 \$708,850. For the properties of the Independent Gas and Power
 Company and Independent Electric Light and Power Company, the
 San Francisco Gas and Electric Company paid in money the sum
 of \$6,089,229.02. The money required for the purchase of the
 aforesaid properties which were paid for in cash was obtained
 1846 by the issuance and sale of \$8,000,000.00 par value of 4½%
 30-year bonds of the San Francisco Gas and Electric Com-
 pany.

The total number of shares of the capital stock of the San Fran-
 cisco Gas and Electric Company heretofore issued is 158,484½ of
 the par value of \$100.00 each. These shares were issued as follows:

To the San Francisco Gas Light Company.....	100,000	shares
To the Edison Light and Power Company.....	27,500	"
To the Pacific Gas Improvement Company.....	28,000	"
To divers persons in January, 1897, at approx- imately \$95.00 per share.....	1,000	"
To divers bondholders in exchange for 148 bonds of the par value of \$1,000.00 each.....	1,973½	"
To the original directors and incorporators at \$100.00 each.....	11	"
Total	158,484½	shares

I have compiled from extant books, papers and records of the
 San Francisco Gas Light Company and the San Francisco Gas and
 Electric Company a statement which shows further details of the
 transactions with reference to which I have testified, and I believe
 that this statement is substantially correct.

This statement was thereupon admitted in evidence and marked
 plaintiff's Exhibit No. 32. The only parts of said Exhibit No. 32

which are deemed essential for the purposes of this record are pages 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 12a, and 14, a true copy of each of which follows:

1847

PLAINTIFF'S EXHIBIT No. 32, PAGE 2.

Statement Showing Adjustment of Investment of S. F. Gas Light Co. Prior to Transfer to S. F. Gas & Elect. Co.'s Books, December 31st, 1896.

Assets:

Real Estate	\$1,365,871.56
Operating Plant & Buildings	3,800,736.35
Street Mains and Services	2,316,356.43
Meters and Lamp-post System	610,349.43
Oil, Coal, & Purifying Material	124,501.48
Sundry Assets	3,728.50
Supplies and Tools	45,634.20
Total Assets	<u>\$8,267,177.95</u>

Liabilities:

Deposits	<u>61,711.51</u>
Net Assets	<u>\$8,205,466.44</u>

NOTE.—This sheet shows book value of assets transferred to San Francisco Gas & Electric Company by San Francisco Gas Light Company which retained assets the book value of which was, in the aggregate, the sum of \$520,141.64. This accounts for difference between amount of investment December 31st, 1896, shown on Sheet #1 and the amount of net assets shown on this sheet.

Statement Showing Adjustment of Book Values for Initial Entry in Books of San Francisco Gas & Electric Co. January 1st, 1897.

Assets:	Book value S. F. Gas Lt. Co.	Increased or decreased (decreases in red).	Value as entered in books of San Francisco Gas & Electric Co.
Real Estate	\$1,392,344.71	332,781.28	1,725,125.99
Construction	3,774,263.20	1,039,941.49	4,814,204.69
Street Mains	1,727,147.92	519,970.75	2,247,118.67
Services	589,208.51	187,189.47	776,397.98
Meters	471,847.56	221,847.56*	250,000.00
Lamp-Post System	138,501.87	63,501.87*	75,000.00
Oils, Coal & Purifying Material	124,501.48	.....	124,501.48
Sundry Assets	3,728.50	.....	3,728.50
Supplies & Tools on hand	45,634.20	.....	45,634.20
Totals	\$8,205,466.44	1,794,533.56	10,000,000.00
Liabilities:			
Gas & Pipe Deposits	61,711.51	.....	61,711.51
Balances	\$8,205,466.44	1,794,533.56	10,000,000.00
Amount of San Francisco Gas & Electric Co. stock issued at par Jan. 1, 1897, in payment of above amount			10,000,000.00

[*In red in copy.]

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PLAINTIFF'S EXHIBIT No. 32, PAGE 4.

Edison Light & Power Company, Statement Showing Net Profits, Dividends, & Surplus for Fiscal Years Ending June 30, 1894, 1895, and 1896, Also Assets and Liabilities at June 30, 1896, All as Shown by Report of D. W. Folger, Pub. Accountant.

	Net profit.	Dividends.	Surplus.
1894	\$167,406.92	137,310.01	30,096.91
1895	170,727.38	160,666.66	10,060.72
1896	190,431.26	161,600.04	28,831.22

Assets & Liabilities Shown by Report of D. W. Folger, Public Accountant, June 30th, 1896.

Assets:

Machinery	\$1,511,856.74
Conduits	438,211.21
Tunnel, Pipe-line, Salt Water Intake, & Wells	79,082.55
Real Estate	139,894.61
Buildings	138,948.46
Office Fixtures, Horses, & Wagons	4,641.05
Good Will	352,906.39
Franchises	178,699.91
Edison Patent Rights	150,000.00
Royalty	1,032.49
Cash	2,501.64
Bills and Accounts Receivable	36,188.57
Miscellaneous Stocks	16,917.71
Supplies on hand	53,608.23

Total Assets \$3,104,489.56

Liabilities:

Bonds	800,000.00
Bills and Accounts Payable	196,659.91
	<hr/>
	996,659.91

Net Assets \$2,107,829.65

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PLAINTIFF'S EXHIBIT NO. 32, PAGE 5.

Statement Showing Book Value of Assets & Liabilities of Edison Light & Power Company as Entered in Books of San Francisco Gas & Electric Co. January 1st, 1897.

Assets:

Real Estate, Construction, Plant	\$2,491,876.99
Conduits and Meters	662,854.23
Edison Patent Rights	150,000.00
Franchises	178,699.91
Sundry Assets	13,189.21
Supplies and tools on hand	54,903.86
	<hr/>
	\$3,551,524.00

Liabilities:

Bonds Outstanding	800,000.00
Electric Deposits	1,524.00
	<hr/>
	801,524.00
Balance	<hr/>
	\$2,750,000.00

In payment for above assets San Francisco Gas & Electric Company assumed liabilities shown above and issued stock at par to amount of	\$2,750,000.00
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PLAINTIFF'S EXHIBIT NO. 32, PAGE 6.

San Francisco Gas & Electric Company.

Statement of Assets and Liabilities January 1st, 1897.

Assets:

Real Estate, Construction, Plant	\$9,031,207.67
Pipes, Lamps, and Meters	3,348,516.65
Conduits and Meters	662,854.23
Edison Patent Rights	150,000.00
Franchises	178,699.91
Oils, Coal, & Purifying Material	124,501.48
Sundry Assets	16,917.71
Supplies and Tools on hand	100,537.86
	<hr/>
	\$13,613,235.51

Liabilities:

Gas & Pipe Deposits	\$61,711.51	
Electric Deposits	1,524.00	
	<hr/>	63,235.51
		<hr/>
Capital Stock	\$12,750,000.00	\$13,550,000.00
Bonds Assumed	800,000.00	
	<hr/>	\$13,550,000.00

Statement Showing Book Values and Purchase Price of Properties, August to November, 1903, of Pacific Gas Improvement Co., Independent Gas & Power Co., Equitable Gas Light Company, Independent Elect. L. & P. Co., Paid by Issuance of Stock, Assumption of Bonds, and Balance in Money.

	Property.	P. G. I. Co.	Equitable.	Independent.
Gas:				
Plant	1,689,598.60	221,744.99	641,694.14
Pipes	2,717,147.80	156,245.65	1,038,322.12
Meters	306,843.69	55,588.22	88,270.55
Lamps	336.79	.....	.....
Elec.:				
Plant	2,205,340.34
Conduits	1,105,508.37
Meters	69,636.92
		4,713,926.88	433,578.86	5,148,772.44
Other assets, excess over liabilities	11,813.89	.....
Liability excess over other assets	38,022.10	.....	274,397.94
		4,675,904.78	445,392.75	4,874,374.50

Statement Showing Book Values and Purchase Price of Properties.—Continued

Property.	P. G. I. Co.	Equitable.	Independent.
Credited Surplus.....	685,904.78	.....	.....
Charged Surplus.....	.....	263,457.25	1,214,854.52
Cost	3,990,000.00	708,850.00	6,089,229.02
Items of Payment:			
Cash .....	.....	708,850.00	6,089,229.02
Bonds Assumed.....	1,190,000.00	.....	.....
S. F. G. & E. Co. Stock.....	2,800,000.00	.....	.....
	3,990,000.00	708,850.00	6,089,229.02

Statement Showing Excess of Cost to San Francisco Gas and Electric Company Over Book Values of Selling Companies, Transactions of 1897 and 1903.

	Excess.	Gains.
San Francisco Gas Light Co.....	1,794,533.56	.....
Edison Light & Power Company.....	640,646.35	.....
Pacific Gas Improvement Company.....	.....	685,904.78
Equitable Gas Light Company.....	263,457.25	.....
Independent Gas & Electric Companies.....	1,214,854.52	.....
San Francisco Gas Light Co.....	.....	50,000.00
Edison Light & Power Co.....	.....	14,250.00
Dividend contribution Jan. 27, '97.....	.....	.....
Pacific Gas Improvement Co. contribution toward purchase Equitable & Independent Companies (7/2/03) (8/17/03).....	.....	200,000.00
Pacific Gas Improvement Co. } Tax Refund C. & C. of S. F.....	.....	1,858.58
San Francisco Gas Light Co. }	.....	158.24
Office Building #415 Post St. }	.....	51,400.64
1897—Payments contributed }	.....	.....
	<u>3,913,491.68</u>	<u>1,003,572.24</u>
	1,003,572.24	
Excess of cost to S. F. Gas & Elect. Co. over book values of selling companies.....	2,909,919.44	
		Equals 13
		78/100% of
		net book
		values.

Book Values Transferred to New Corporations, 1897 and 1903.

San Francisco Gas Light Company.....	\$8,205,466.44
*Edison Light & Power Company.....	2,909,353.65
Pacific Gas Improvement Company.....	4,675,904.78
Equitable	445,392.75
Independents	4,874,374.50
	<hr/>
	21,110,492.12

1854 PLAINTIFF'S EXHIBIT No. 32, PAGE 10.

Balance Sheet, San Francisco Gas & Electric Company, December 31st, 1905.

Assets.

†Real Estate, Construction, and Plant.....	\$14,788,270.29
†Pipes, Street Lamps (Gas), and Meters, Conduits, Are Lamps and Pole Lines.....	11,553,835.50
Oil and Anthracite Coal.....	76,942.59
Cash on hand.....	190,381.51
Sundry Assets.....	57,975.46
Supplies and Tools on hand.....	183,285.24
Amount due from Consumers' Gas & Electric.....	401,910.84
Investments (Co.'s own Bonds) (1071).....	1,049,148.33
	<hr/>
	28,301,749.86

*Assets June 30, 1896, less difference in liabilities as between June 30th, 1896, and Jan. 1st, 1897.

†Subdivided as to classes.

Liabilities.

Capital Stock.....	\$15,848,433.33	
Less discount on 2,973½ Shrs....	54,148.97	
		15,794,284.36
Bonds issued by S. F. G. & E. Co. (Thirty year 4½%)		8,041,000.00
Bonds issued by P. G. I. Co. (Thirty year 4%) ..		1,149,000.00
Bonds issued by E. L. & P. Co. (6%)		623,000.00
Bond Interest.....		63,325.00
Uncollected Dividends.....		3,818.74
Unpaid Payroll.....		70,682.45
Notes Payable.....		350,000.00
Outstanding and Suspended Accounts.....		357,883.07
Insurance Contingent Funds.....		224,700.20
Surplus December 31st.....		1,624,056.04
		<hr/>
		28,301,749.86
Gas	\$17,527,505.05	
Electric	8,814,600.74	
		<hr/>
Total	26,342,105.79	

1855 PLAINTIFF'S EXHIBIT NO. 32, PAGE 11.

San Francisco Gas & Electric Company.

Loss and Gain Accounts and Surplus, 1905.

Loss and Gain.

Revenue year 1905.....	\$4,687,612.92	
Charges or Costs.....	2,707,934.86	
		<hr/>
Net available profit for year.....	1,979,678.06	
Dividends paid during year.....	792,421.68	
		<hr/>
Surplus for year 1905.....		\$1,187,256.38

Surplus Account.

Surplus December 31st, 1904.....	\$218,835.41	
Profit 1905.....	1,187,256.38	
		<hr/>
		1,406,091.79
Patents & Licenses and Sundry Assets charged off..		160,930.44
		<hr/>
		1,245,161.35
Balance of Depreciation Account Closed into Surplus Acct. December 31st, 1905.....		378,894.69
		<hr/>
Net Surplus December 31st, 1905.....		\$1,624,056.04

1856

PLAINTIFF'S EXHIBIT NO. 32, PAGE 12.

List of Small Competing Electric Companies Purchased by San Francisco Gas & Electric Co. After 1896.

Western Light & Power Co.—Basement Genl. Keyes' Bldg. Stockton St. Balance of stock; majority previously purchased by the Edison Light & Power Company before its consolidation with the San Francisco Gas Light Company. August, 1897. Cost \$9,024.00 (2,256 shares stock @ \$4.00).

Commercial Steam Power Co.—Sacramento Street near Sansome. August 1898. Cost \$85,000.00.

Pacific Power Company.—Stevenson Street near 1st. May 1904. Cost \$15,000.00.

Standard Electric Company.—S. F. Distributing Plant, Stevenson St. nr. 1st. June 1904. Cost \$20,000.00.

California Hotel—Electric Supply Business.—Bush Street nr. Grant Ave. April 5, 1905. Cost \$4,000.00.

Statement Showing Expenditures of San Francisco Gas & Electric Company for Retiring Assumed Bonds and Purchasing Its Own Bonds Between January 1, 1897, and December 31, 1905.

Bonds of Edison Light & Power Company.

Original issue outstanding January 1, 1897.....	\$800,000.00
Retired by issuance of 1,973 $\frac{1}{2}$ shares of the stock of the San Francisco Gas & Elect. Co. 148,000.00	
Retired by purchase of bonds of the California Electric Light Company 29,000.00	
	<hr/>
	177,000.00
	<hr/>
Balance outstanding Dec. 31, '05.....	623,000.00

Bonds of Pacific Gas Improvement Company.

Assumed by San Francisco Gas & Elect. Co. 1903.....	\$1,190,000.00
Retired by exchange for S. F. Gas & Elect. Co.'s Bonds.....	41,000.00
	<hr/>
Balance outstanding Dec. 31, '05.....	1,149,000.00

Bonds of San Francisco Gas & Electric Co.

Original issue, outstanding 1903.....	8,000,000.00
Issued to retire Pacific Gas Improvement Co.'s Bonds.....	41,000.00
	<hr/>
Total issue—December 31, '05.....	8,041,000.00
S. F. Gas & Elect. Co. Bonds purchased and held in treasury.....	1,071,000.00
	<hr/>
Outstanding in hands of public Dec. 31, '05.....	6,970,000.00

Statement Showing Expenditures of San Francisco Gas & Electric Company.—Continued.

Bond Sale Return and Expenditure for Purchase of Equitable and Independent Companies.

Return from sale of S. F. Gas & Electric Co. Bonds Nov. '03.....	8,000,000.00
Bond discount Nov. 17, '03, 5% on 6,500,000.00.....	325,000.00
" " " 23, " 5% " 1,500,000.00.....	75,000.00
Attorney's Fees in Bond matter.....	10,000.00
American Bank Note Co.—printing.....	7,000.00
	<hr/>
	417,000.00
	<hr/>
Amount expended for purchase of Equitable & Independent properties.....	6,798,079.02
Attorney's fees in conjunction therewith.....	5,000.00
	<hr/>
	6,803,079.02
	<hr/>
Balance of money available.....	779,920.98

1858

PLAINTIFF'S EXHIBIT No. 32, PAGE 14.

Statement of Lowest and Highest Monthly Market Values of Stocks, S. F. Gas Light Company and Edison Light & Power Company, July, 1896, to January, 1897, Inclusive, as per Quotations of S. F. Stock and Bond Exchange.

	S. F. Gas Light Co.		Edison Light & Power Co.	
	Lowest.	Highest.	Lowest.	Highest.
July, 1896.....	88.87 1/2	\$94.25	\$113.75	\$120.50
Aug., ".....	85.50	89.62 1/2	107.50	113.50
Sept., ".....	89.50	93.50	114.00	118.75
Oct., ".....	92.00	94.50	118.50	119.25
Nov., ".....	93.75	98.62 1/2	120.50	126.00
Dec., ".....	97.37 1/2	98.37 1/2	124.25	126.25
Jan., 1897.....	97.25	99.25	124.50	127.25

1859 A few days later, the witness being recalled, testified in substance as follows:

With the assistance of Mr. J. D. Butler, the auditor of the Pacific Gas and Electric Company's San Francisco District, I have discovered some additional records of the San Francisco Gas and Electric Company which included balance sheets of the San Francisco Gas and Electric Company for the years ending 1902, 1903, 1904, and 1905; a statement of the San Francisco Gas and Electric Company's profit and loss account for the calendar years 1902 and 1903; a report of Messrs. Knight, McLaren and Goode, certified public accountants, dated February 2, 1904, relating to the books of account of the Independent Electric Light and Power Company and the Independent Gas and Power Company; a statement by the president of the Equitable Gas Light Company with respect to the assets and liabilities of that company as of August 31, 1903; and divers other matters. I have prepared a statement containing the papers mentioned above which I believe to be substantially correct.

This statement was thereupon admitted in evidence and marked plaintiff's Exhibit No. 40. A true copy of each of the following pages, to-wit, pages 2, 3, 4, 5, 6, 7, 8, 9a and 9b, is as follows:

San Francisco Gas & Electric Co.

Balance Sheet December 31, 1902.

Assets.

Real Estate, Construction, and Plant.....	\$10,018,028.40
Pipes, Conduits, Lamps, and Meters.....	4,468,567.65
Patents and Licenses.....	150,000.00
Oil, Coal, and Purifying Materials.....	54,357.43
Cash on hand.....	1,987.99
Sundry Assets	79,691.34
Supplies and Tools on hand.....	104,644.46
Amount due from Consumers for Gas and Electric Current.....	125,785.59

\$15,003,062.86

Liabilities.

Capital Stock 200,000 shares of \$100 each..... \$20,000,000.00

Of which have been issued 130,484 $\frac{1}{2}$ fully paid
shares @ \$100 each..... 13,048,433.33

Less Stock Discount on 2,973 $\frac{1}{2}$ shares..... 54,148.97

12,994,284.36

Bonds issued by Edison Light & Power Co.....	623,000.00	
Bond Interest	7,865.00	
Uncollected Dividends	5,497.30	
Wages	28,180.15	
Bills Payable	195,000.00	
Outstanding and Suspended Accounts.....	132,750.20	
Depreciation and Insurance Funds.....	353,706.48	
Surplus, Dec. 31, 1901.....	240,943.77	
Profit for the year 1902.....	421,835.60	
	<hr/>	
	662,779.37	
	<hr/>	
		\$15,003,062.86

1861

EXHIBIT 40, PAGE 3.

San Francisco Gas and Electric Co.

Balance Sheet December 31, 1903.

Assets.

Real estate, construction and plant.....	\$15,607,937.61
Pipes, conduits, lamps and meters.....	10,097,007.23
Patents and Licenses.....	150,000.00
Oil, coal and purifying materials.....	120,599.04
Cash on hand.....	21,482.07
Sundry assets.....	119,671.89
Supplies and tools on hand.....	349,084.20
Amount due from consumers for gas and electric accounts.....	276,580.44
Investments (stocks and bonds).....	1,054,735.00
	<hr/>
	\$27,797,097.48

Liabilities.

Capital stock 200,000 shrs. of \$100 each.....	\$20,000,000.00
Of which have been issued 158,484½ fully paid shares at \$100 each.....	15,848,433.33
Less stock discount on 2,973½ shares.....	54,148.97
	<hr/>
Bonds issued by S. F. G. & E. Co. (30 yrs. 4½%).....	\$15,794,284.36
Bonds issued by Pac. Gas Imp. Co.....	8,000,000.00
Bonds issued by Edison Light & P. Co.....	1,190,000.00
	<hr/>
	623,000.00

Bond interest	71,366.66
Uncollected Dividends	5,450.00
Unpaid payrolls	61,608.95
Bills payable	985,000.00
Outstanding and Suspended accounts	355,958.22
Depreciation and Insurance Funds	664,518.45
Surplus	45,910.84

\$27,797,097.48

On December 31, 1902, the surplus was	\$662,779.37
The surplus earnings for 1903, after payment of the divd. during the year of 2½%, were	178,745.77

841,525.14

There were charged to surplus, on account of capitalizing the prop- erties acquired from the I. G. & P. Co., I. E. L. & P. Co., P. G. I. Co., Equitable Gas L't Co., at the actual costs to these companies, rather than at the price the S. F. G. & E. Co. paid therefor	792,406.99
Account of various other items	3,207.31

795,614.30

Balance of Fund December 31, 1903	\$45,910.84
---	-------------

\$45,910.84

1862

EXHIBIT 40, P. 4.

San Francisco Gas & Electric Co.

Balance Sheet, December 31st, 1903.

Assets.

Gas:

Real Estate, Buildings, etc.	\$4,248,748.37
Steam Machinery	638,400.50
Mfg. Apparatus	4,589,730.18
Mains	6,426,910.20
Services	648,958.75
Meters	813,651.76
Lamps	77,489.67
	<hr/>

\$17,443,889.43

Electric:

Real Estate, Buildings, etc.	1,452,140.80
Steam Machinery	2,500,007.06
Generating Machinery	1,215,154.50
Conduits	1,820,734.28
Services	112,586.18
Meters	196,676.39
Distribution, Miscellaneous	963,756.20
	<hr/>

8,261,055.41

Current Assets:

Cash in Bank	21,482.07	
Cash in Office	174,865.86	
Due from Consumers (Gas)	101,714.58	
" " (Elec.)	29,210.60	
Sundry Sales (Gas)	9,537.32	
" " (Elec.)	23,791.95	
Miscellaneous		360,602.38
		<hr/>

Stock Assets:

Anthracite Coal	71,759.66	
Bituminous Coal	7,519.35	
Oven Coke	5,963.23	
Gas Oil	16,181.93	
Purifying Materials	11,233.90	
Fuel Oil	7,940.97	
Storeroom	357,616.63	
		<hr/>
		478,215.67

Sundry Assets:

Equitable Gas Light Stock	803,585.00*	
Bonds (30 years, 4½ % held in Treasury)	960,000.00	
Patents and Licenses	150,000.00	
Miscellaneous	48,599.59	
		<hr/>
		1,962,184.59
		<hr/>
		\$28,505,947.48

Balance Sheet, December 31st, 1903.—Continued.

1863

Liabilities.

Capital Stock, 158,484 $\frac{1}{2}$ fully paid shares @ \$100.00 each.	Less
Stock Discount 2,973 $\frac{1}{2}$ shares \$54,148.97	\$15,794,284.36
Bonds, S. F. G. & E. Co. (30 yr. 4 $\frac{1}{2}$ %)	8,000,000.00
" Pac. Gas Imp. (30 yr. 4%)	1,190,000.00
" Edison (6%)	623,000.00
	<hr/>
	\$25,607,284.36

Current Liabilities:

Notes Payable	1,693,850.00*
Banks	24,912.25
Unpaid Pay-rolls	61,608.95
" Vouchers	250,958.00
" Dividends	5,450.00
Unclaimed Wages	312.20
Gas, Elec. Deposits	50,354.13
Elec. "	1,319.70
Service "	1,922.30
	<hr/>
	2,090,687.53

Deferred Liabilities:

Int. on Bonds, accrued, not due	71,366.66
Taxes, accrued, not due	.00
	<hr/>
	71,366.66

Contingent Liabilities:

Wear and Tear, Deprec., etc. (Gas)	300,027.72
" " (Elec.)	227,790.53
Insurance Contingent Fund (Gas)	96,700.20
" " (Elec.)	40,000.00
Miscellaneous	26,179.64
Surplus, December 31st	

690,698.09
45,910.84

\$28,505,947.48

*NOTE.—Difference of \$708,850 between these items upon this copy of Co.'s Balance Sheet and consolidated balance sheet by Public Accountants, represents amount of Equitable Gas Light Company purchase consummated in August.

San Francisco Gas & Electric Co.

Balance Sheet, December 31st, 1904.

Assets.		
Gas:		
Real Estate, Buildings, etc.	.....	\$4,268,922.39
Steam Machinery	.....	641,871.11
Mfg. Apparatus	.....	4,474,565.97
Mains	.....	6,454,397.30
Services	.....	649,016.96
Meters	.....	869,881.76
Lamps	.....	81,114.88
		<hr/>
Electric:		
Real Estate, Buildings, etc.	.....	1,601,491.77
Steam Machinery	.....	2,543,573.13
Generating Machinery	.....	1,246,654.05
Conduits	.....	1,863,504.29
Services	.....	118,532.62
Meters	.....	216,084.49
Distribution, Miscellaneous	.....	1,024,145.90
		<hr/>
Current Assets:		
Cash in Bank	.....	3,216.63
Cash in Office	.....	16,059.85
		<hr/>
		17,439,770.37
		<hr/>
		8,613,986.25

Due from Consumers (Gas)	178,406.78
Due from Consumers (Elec.)	125,038.11
Sundry Sales (Gas)	32,939.39
Sundry Sales (Elec.)	21,352.52
Miscellaneous	41,668.89
	<hr/>
	418,682.17

Stock Assets:

Anthracite Coal	181,109.23
Oven Coke	11,402.14
Gas Oil	44,205.15
Purifying Materials	15,095.04
Fuel Oil	11,758.72
Storeroom, etc.	245,740.11
	<hr/>
	509,310.39

Sundry Assets:

Bonds (30 years, 4½%, held in Treasury)	980,000.00
Patents and Licenses	150,000.00
Miscellaneous	6,930.44
	<hr/>
	1,136,930.44

Liabilities.

1865

Capital Stock, 158,484½ fully paid shares @ \$100.00 each, Less Stock Discount on 2,973½ shares, \$54,148.97	\$15,794,284.36
Bonds S. F. G. & E. Co. (30 yr. 4½%)	8,021,000.00
Bonds, Pac. Gas Imp. (30 yr. 4%)	1,169,000.00
Bonds Edison (6%)	623,000.00
	<hr/>
	25,607,284.36

Balance Sheet, December 31st, 1904.—Continued.

Current Liabilities:

Notes Payable	830,000.00
Banks .....	.00
Unpaid Pay-Rolls	67,707.33
Unpaid Vouchers	198,907.86
Unpaid Dividends	14,902.35
Unclaimed Wages	767.70
Gas, Elec. Deposits	50,610.68
Intermediate Deposits (Gas)	505.00
Electric Deposits	1,301.20
Service Deposits	5,911.30
	<hr/>

1,170,613.42

Deferred Liabilities:

Int. on Bonds, accrued not due Edison	7,805.00
" " " " " S. F. G. & E.	52,500.00
" " " " " P. G. I.	3,896.66
	<hr/>

64,201.66

Contingent Liabilities:

Replacement, Deprec., etc. (Gas)	667,873.73
" " " " (Elec.)	150,836.52
Insurance Contingent Fund (Gas)	121,700.20
" " " " (Elec.)	57,500.00
Miscellaneous	59,834.32
	<hr/>

1,057,744.77
218,835.41

Surplus, Dec. 31st, 1904

\$28,118,679.62

San Francisco Gas and Electric Company.

Balance Sheet, December 31st, 1905.

Gas:		Assets.	
Real Estate, Buildings, etc.			\$4,268,922.39
Steam Machinery			641,526.73
Mfg. Apparatus			4,434,565.97
Mains			6,513,101.80
Services			683,532.14
Meters			904,717.58
Lamps			81,114.88
Dist. Miscel.			23.56
			<hr/>
			17,527,505.05
Electric:			
Real Estate, Buildings, etc.			1,647,650.20
Steam Machinery			2,549,312.08
Generating Machinery			1,246,292.92
Conduits			1,890,126.79
Services			128,071.17
Meters			233,445.61
Dist. Miscel.			1,119,701.61
			<hr/>
			8,814,600.74
Current Assets:			
Cash in Book			173,473.30
Cash in office			16,908.21
Due from Consumers (Gas)			177,432.53

Balance Sheet, December 31st, 1904.—Continued.

Current Liabilities:

Notes Payable	830,000.00
Banks .....	.00
Unpaid Pay-Rolls	67,707.33
Unpaid Vouchers	198,907.86
Unpaid Dividends	14,902.35
Unclaimed Wages	767.70
Gas, Elec. Deposits	50,610.68
Intermediate Deposits (Gas)	505.00
Electric Deposits	1,301.20
Service Deposits	5,911.30
	<hr/>

1,170,613.42

Deferred Liabilities:

Int. on Bonds, accrued not due Edison	7,805.00
" " " " " S. F. G. & E.	52,500.00
" " " " " P. G. I.	3,896.66
	<hr/>

64,201.66

Contingent Liabilities:

Replacement, Deprec., etc. (Gas)	667,873.73
" " (Elec.)	150,836.52
Insurance Contingent Fund (Gas)	121,700.20
" " (Elec.)	57,500.00
Miscellaneous	59,834.32
	<hr/>

1,057,744.77
218,835.41

Surplus, Dec. 31st, 1904

\$28,118,679.62

San Francisco Gas and Electric Company.

Balance Sheet, December 31st, 1905.

Gas :		
Assets.		
Real Estate, Buildings, etc.		\$4,268,922.39
Steam Machinery		641,526.73
Mfg. Apparatus		4,434,565.97
Mains		6,513,101.80
Services		683,532.14
Meters		904,717.58
Lamps		81,114.88
Dist. Miscel.		23.56
		<hr/>
		17,527,505.05
Electric:		
Real Estate, Buildings, etc.		1,647,650.20
Steam Machinery		2,549,312.08
Generating Machinery		1,246,292.92
Conduits		1,890,126.79
Services		128,071.17
Meters		233,445.61
Dist. Miscel.		1,119,701.61
		<hr/>
		8,814,600.74
Current Assets:		
Cash in Book.		173,473.30
Cash in office.		16,908.21
Due from Consumers (Gas).		177,432.53

Balance Sheet, December 31st, 1905.—Continued.

Due from Consumers (Elec.)	142,470.47
Sundry Sales (Gas)	14,526.74
Sundry Sales (Elec.)	37,640.26
Investment other than Bonds	780.43
Gas Stove Sales	29,840.84

593,072.78

Stock Assets:

Anthracite Coal	33,157.30
Oven Coke	3,488.71
Gas Oil	27,750.46
Fuel Oil	12,546.22
Storeroom	183,285.24
* Miscellaneous	6,575.55

266,803.48

Bonds (30 yrs. 4½%) Held in Treas.	1,049,148.33
Advance Taxes (Gas)	23,578.73
Advance Taxes (Elec.)	8,830.57
Advance Insurance (Gas)	161.54
Advance Insurance (Elec.)	2,812.44
Standard Elec. Co. of Cal.	15,236.20

1,099,767.81

\$28,301,749.86

*Misc.	Gas on Hand	1,391.61
	Tar on Hand	4,120.48
	Gas Coke	1,063.46
		<u>6,575.55</u>

1867

Liabilities.

Capital stock, 158,484½ fully paid shares @ \$100.00 ea. less Stock
Discount on 2,973½ shares, \$54,148.97.....
Bonds, S. F. G. & E. Co. (30 yr. 4½%).....
Pac. Gas Imp. Co. (30 yr. 4%).....
Edison (6%)

\$15,794,284.36
8,041,000.00
1,149,000.00
623,000.00

25,607,284.36

Current Liabilities:

Notes Payable.....
Unpaid Payrolls.....
Unpaid Vouchers.....
Unpaid Dividends.....
Unclaimed Wages.....
Has-Elec. & Intermediate Meter Deposits.....
Electric Deposits (Edison).....
Service Deposits

350,000.00
70,682.45
233,749.57
3,818.74
793.35
49,969.98
1,287.70
2,993.55

713,295.34

Deferred Liabilities:

Int. on Bonds Accrued not due, Edison.....
Int. on Bonds Accrued not due, P. G. I. Co.....
Int. on Bonds Accrued not due, S. F. G. & E. Co.....

7,370.00
3,830.00
52,125.00

63,325.00

Balance Sheet, December 31st, 1905.—Continued.

Contingent Liabilities:

Insurance Contingent Fund (Gas).....	142,200.20	233,389.12
Insurance Contingent Fund (Elec.).....	82,500.00	1,624,056.04
Electric Storage Battery Co.....	7,802.62	
Suspended Credits	886.30	
Surplus December Dist.....	.....
Bad Debts Accrued (Gas).....	51,800.00	
Bad Debts Accrued (Elec.)	8,600.00	60,400.00
	.....	<u>\$28,301,749.86</u>

San Francisco Gas & Electric Co.

Profit and Loss Account, Jan. 1, 1902, to Dec. 31, 1902.

Income.

Gas:

Sales of Gas.....	\$1,129,199.03
“ Coke	14,627.80
“ Tar	7,507.11
“ Ammoniacal Liquor	1,606.96
Wharfage and Rents.....	2,775.12
Creditors' Discount	1,253.25
Sundries	22,205.19
	<hr/>

1,179,174.46

Electric:

Sales of Current.....	801,353.78
Sales of Steam	5,523.48
Jobbing	702.32
Creditors' Discount	574.61
Sundries	2,505.71
	<hr/>

810,659.90

\$1,989,834.36

Expenditure.

Gas:

Coal Carbonized	61,450.38
Anthracite Coal used.....	176,833.36
Gas, Oil used.....	154,854.92
Wages and Salaries	177,484.81

Profit and Loss Account, Jan. 1, 1902, to Dec. 31, 1902.—Continued.

Legal Expenses	3,504.60		
Taxes	47,183.57		
Gas Stoves	3,496.46		
Repairs and General Expense	157,109.76		
Amount written off to Depreciation Wear & Tear Contingent Fund	118,550.59		
Amount written off to Insurance Fire and Accident Fund	25,000.00	925,468.45	
Electric:			
Fuel used	187,490.87		
Wages and Salaries	119,580.62		
Carbons	9,714.05		
Legal Expense	1,772.50		
Taxes	17,409.76		
Current Purchased	23,081.43		
Repairs and General Expense	107,550.49		
Amount written off to Depreciation Wear & Tear Contingent Fund	118,550.59		
Amount written off to Insurance Fire and Accident Fund	20,000.00		
Bond Interest	37,380.00	642,530.31	
			<u>1,567,998.76</u>
Net Profit for year 1902.....			<u>\$421,835.60</u>

NOTE.—The amount of Net Profit shown \$421,835.60 as above, was calculated by Public Accountants and is \$1,385.58 greater than that shown by the Co.'s Auditor, due probably to some item construed by them as profit and not so construed by the company.

San Francisco Gas & Electric Co.

Profit and Loss Account, January 1, 1903, to December 31, 1903.

Income.

Gas:

Sales of Gas.....	\$1,445,304.60
Sales of Tar.....	4,510.46
Wharfage and Rents.....	2,742.37
Creditors' Discount	985.59
Sundries	40,202.95
	<hr/>
	\$1,493,745.97

Electric:

Sales of Current.....	\$997,407.01
Sales of Steam.....	5,341.62
Jobbing	389.98
Creditors' Discount	579.38
Sundries	7,306.64
	<hr/>
	\$1,011,024.63

\$2,504,770.60

Expenditure.

Gas:

Anthracite Coal used.....	\$152,983.90
Gas Oil used.....	161,441.86
Wages and Salaries.....	216,011.07
Legal Expenses	3,658.63

Profit and Loss Account, Jan. 1, 1903, to Dec. 31, 1903.—Continued.

Taxes	50,006.40	
Gas Stoves	6,173.30	
Repairs and General Expenses	312,319.51	
Amount written off to Depreciation Wear and Tear, and Contingent Fund	175,000.00	
Amount written off to Insurance, Fire and Accident Fund	25,000.00	
Bond Interest	43,837.50	
		<u>\$1,146,432.17</u>
Electric:		
Fuel Used	\$183,728.66	
Wages and Salaries	170,121.67	
Carbons	11,457.63	
Legal Expenses	1,555.24	
Taxes	21,123.87	
Current Purchased	33,435.30	
Repairs and General Expense	115,891.96	
Amount written off to Depreciation, Wear and Tear, and Contingent Fund	175,000.00	
Amount written off to Insurance, Fire and Accident Fund	20,000.00	
Bond Interest	51,037.50	
		<u>\$783,381.83</u>
Gross Profit for year		\$1,929,814.00
Less Dividend paid during year		\$574,956.60
		396,210.83
Net Profit for year 1903		<u>\$178,745.77</u>

Knight, McLaren & Goode,
Certified Public Accountants.

530 California St.

San Francisco, Cal., Feb. 2nd, 1904.

The President and Board of Directors,
San Francisco Gas & Electric Co.,
415 Post St., San Francisco.

GENTLEMEN:—Referring to our report made to you on December 2nd, 1903, on the accounts of the Independent Gas & Power Co. and the Independent Electric Light & Power Co., we beg to submit the following statement of the cost of the plant, material and other assets turned over by them to the San Francisco Gas & Electric Co., October 31st, 1903. Our figures include interest charges at the rate of six per cent on Construction Expenditures only.

Gas:

Plant	\$641,694.14
Pipes	1,038,322.12
Meters	88,270.55
Supplies	84,374.70
Anthracite Coal	1,192.26
Gas Oil	1,635.91
Oven Coke	1,295.46
Tar	488.70
Distribution Supplies	7,325.65
Accounts Receivable	7,982.86
“ Sales Gas	26,683.20
Cash	18,882.83
	<hr/>
	\$2,018,148.38

EXHIBIT 40, P. 9-A.—Continued.

Electric:

Plant	2,274,977.26
Conduits	1,105,508.37
Supplies	55,479.15
Fuel Oil	4,383.75
Oil & Waste	618.52
Carbons	670.32
Globes	163.81
Jobbing—Nernst Lamps	37.65
Generating Supplies	5,851.12
Distribution Supplies	5,851.13
Accounts Receivable	6,501.85
“ Sales Current	46,295.83
Cash	12,356.80
	<hr/>

3,518,695.56

Loss:	
Accounts Payable	55,842.77
Bills Payable	625,000.00
Casualty Insurance Accrued	2,862.64
	<hr/>

\$5,536,843.94

683,705.41

\$4,853,138.53

Yours very respectfully,

KNIGHT, McLAREN & GOODE.

This is to certify that the actual cost of the plant complete of the Equitable Gas Light Company, as shown by the books of the Company, is as follows:

Aug. 31. Gas Manf. Plant foot of Hyde St.....
 Oct. 1. Claims against plant, presented after books were closed
 Aug. 31st, 1903.....

\$208,456.02

698.96

\$209,154.98

Street Mains:

20" Mains.....	2,987.70
16" ".....	22,458.63
12" ".....	7,363.58
10" ".....	6,415.27
8" ".....	8,486.55
6" ".....	31,928.53
4" ".....	21,674.56
3" ".....	236.84
2" ".....	386.44
Street work	7,982.56

109,920.66
 46,324.99
 55,588.22
1,153.61

422,142.46
 11,436.40
 1,052.69
 5,357.18

2 Lots Real Estate on Beach St.....
 Stock of oil, coal and firebrick, per inventory.....
 Bank account and petty cash on hand.....

EXHIBIT 40, P. 9-B.—Continued.

The following book accounts receivable:

Sundry unpaid gas accounts.....	13,088.45
Account of W. P. Fuller and Co.....	150.00
“ “ M. Friedlander and Co.....	25.50
“ “ Mrs. Chase	13.00
“ “ Sundry persons for merchandise.....	288.34
“ “ “ stoves.....	619.40
	<hr/>
	14,184.69

Less following accounts payable:

Account of Pacific Coast Co.....	7,401.36
“ “ P. A. McDonald.....	582.65
Amounts due sundry persons on deposit.....	48.80
Amounts due sundry persons pay rolls.....	48.90
Sundry accounts payable	698.96
	<hr/>

8,780.67

5,404.02

445,392.75

F. G. DRUM,
President.

Attest:
[SEAL.] S. H. TACY,
Secretary.

1872 In addition to the properties mentioned above, the San Francisco Gas and Electric Company acquired the electric properties of certain small companies as shown on page 12 of Exhibit No. 32.

Mr. NORMAN McLAREN, a witness called for the plaintiff, testified in substance as follows:

I am 57 years old, reside in San Francisco and am a public accountant. I have been a public accountant for 24 years and was at one time a member of the firm of Knight, McLaren and Goode. That firm was in existence from 1897 until it was dissolved in the year 1906.

The witness was here shown the original statement, a true copy of which appears as page 9a of plaintiff's Exhibit No. 40, which was dated February 2, 1904, and bore the signature of Knight, McLaren and Goode. The witness continued:

The signature to that statement was signed by me and that statement or report was prepared under my direction and was based upon an examination of the books of the Independent Gas and Power Company and the Independent Electric Light and Power Company which I personally made. That report truly and correctly sets forth the assets and liabilities of those two companies as the same appeared upon their books at that time. In my examination of the books and records of the Independent Gas and Power Com-
1873 pany and the Independent Electric Light and Power Company, I went farther than examining their books; I had about 12 people employed under my direction and caused inventories of the supplies and materials and all property on hand to be made. I took certain expert advice with reference to that property. I also examined the vouchers very closely and examined the books from the beginning. My recollection is that we examined all of the cost vouchers in connection with the construction of the plants of those companies and the result was that we found the books to be perfectly correct. This statement was drawn up in accordance with those books. We did not find any intangibles included in the assets of those companies as shown on their books.

My firm had acted as accountants for the San Francisco Gas and Electric Company for two or three years prior to 1903. In examining the books of the Independent Gas and Power Company and the Independent Electric Light and Power Company we acted as public accountants, having been employed for that purpose by the San Francisco Gas and Electric Company.

The witness was here shown a copy of the printed annual report of the San Francisco Gas and Electric Company covering the calendar year 1902 which contained a balance sheet as of December 31, 1902, and a profit and loss account for that year. The balance sheet in that report is identical with the balance sheet copied as page
1874 2 of plaintiff's Exhibit No. 40 and the profit and loss account for that year is identical with the profit and loss account

copied as page 7 of plaintiff's Exhibit No. 40. The witness was also shown the printed annual report of the San Francisco Gas and Electric Company containing, among other things, a balance sheet and a profit and loss account prepared as of December 31, 1903. Page 3 of plaintiff's Exhibit No. 40 is a true copy of said balance sheet and page 8 of plaintiff's Exhibit No. 40 is a true copy of said profit and loss account.

The balance sheets and the profit and loss accounts for the years 1902 and 1903 appearing in the printed annual reports of the San Francisco Gas and Electric Company for those years were prepared under my supervision. While I cannot identify the figures in these balance sheets and profit and loss accounts, I know that I made up those statements for the company and that my reports were incorporated in the annual reports for those years and that when those reports were printed I verified the statements contained in them by reference to my own records.

Counsel for defendant here admitted that the printed reports referred to were the same as those which had been examined by Mr. McLaren as stated in the latter's testimony.

Mr. CHARLES L. BARRETT, recalled for cross-examination, testified in substance as follows:

1875 The San Francisco Gas Light Company, upon its organization, bought the properties of the San Francisco Gas Company, the Metropolitan Gas Company and the City Gas Company in 1873; that is to say, their plants and materials on hand. The San Francisco Gas Light Company did not take over money on hand or assume any of the liabilities of its grantors. I cannot say from what source the opening entry of assets in the books of the San Francisco Gas Light Company was made. I do not know whether the properties acquired by the San Francisco Gas Light Company in 1873 were appraised at the time or not. It is impossible to tell from such of the records of the San Francisco Gas Light Company as have been preserved what were the details of the additions and betterments or the details of properties abandoned during the period from April, 1873, to January, 1897.

Mr. M. H. BRIDGES, plaintiff's general auditor, recalled for the plaintiff, testified in substance as follows:

The books of the Pacific Gas and Electric Company in my custody show the cost to that company of the properties acquired by it from the San Francisco Gas and Electric Company. About January 2, 1906, the Pacific Gas and Electric Company concluded the 1876 purchase of more than 90% of the issued and outstanding shares of stock of the San Francisco Gas and Electric Company the total amount of which was at that time 158,484 $\frac{1}{2}$, having a par value in the aggregate of \$15,848,433 $\frac{1}{2}$. The Pacific Gas and Electric Company's contract with the representatives of the stockholders of the San Francisco Gas and Electric Company obligated

the former to buy so many of the shares of the latter as might be offered to it at the agreed price. The price paid by the Pacific Gas and Electric Company for the shares of the San Francisco Gas and Electric Company's stock purchased in January, 1906, was \$90.00 per share. More than 150,000 shares of that stock were purchased at that time for that price. Some of the remaining shares have been purchased since that time at a higher price and some at a lower price. My recollection is that all of the stock except approximately 1,500 shares came under the original contract in January, 1906. The stock purchased in January, 1906, was paid for as follows, viz: \$25.00 per share in money and \$65.00 per share in general and collateral trust mortgage bonds, bearing interest at the rate of 5% per annum, issued by the Pacific Gas and Electric Company at par and accrued interest. All of those bonds were called and redeemed in the early part of the year 1912 at the call price specified in the mortgage, to-wit, par and accrued interest plus a premium of 5%.

No part of the purchase price of stock of the San Francisco Gas and Electric Company was paid by the issuance of stock of the Pacific Gas and Electric Company. Those bonds were secured by a mortgage of all of the property of the Pacific Gas and Electric Company which included the stock of the California Gas and Electric Corporation and the stock of the San Francisco Gas and Electric Company which it had purchased.

On January 2, 1906, at the time when the Pacific Gas and Electric Company consummated the purchase of more than 90% of the issued stock of the San Francisco Gas and Electric Company, there were outstanding bonds secured by mortgage or deed of trust of either the whole or some part of the properties then owned by the San Francisco Gas and Electric Company as follows:

	Par value.
4½% bonds of the issue by San Francisco Gas and Electric Company in 1903	\$6,970,000.00
4% bonds issued by Pacific Gas Improvement Company	1,149,000.00
6% bonds issued by Edison Light and Power Company	623,000.00
Total	<u>\$8,742,000.00</u>

In November and December, 1911, the San Francisco Gas and Electric Company purchased and acquired by deed of conveyance the gas plant properties and distribution system of the Metropolitan Light and Power Company which were first conveyed by that company to the Metropolitan Gas Corporation and by the latter to the San Francisco Gas and Electric Company. The consideration for the purchase of those properties was the assumption by the San Francisco Gas and Electric Company of outstanding bonds of Metropolitan Gas Corporation of the aggregate par value of \$1,368,000.00 secured by a deed of trust of the properties conveyed and the payment of the sum of \$750,000.00 plus some additional amounts resulting from the adjustment of bills and

accounts receivable and bills payable and materials and supplies on hand. The total amount of cash actually paid for those properties was \$813,356.21.

In the early part of 1906, soon after the Pacific Gas and Electric Company purchased the stock of the San Francisco Gas and Electric Company, the California Gas Company constructed an oil gas generating plant at the Potrero Station of the San Francisco Gas and Electric Company and conveyed that plant to the San Francisco Gas and Electric Company at cost, as the same appeared on that company's books, to-wit, \$175,732.13.

In November and December, 1911, the San Francisco Gas and Electric Company conveyed to the Pacific Gas and Electric Company by deed all of its properties, including its gas and electric plants and systems already referred to which included the properties purchased from the Metropolitan Light and Power Company and the Metropolitan Gas Corporation. The consideration for that transfer of properties was the issuance by the Pacific Gas and Electric Company to the San Francisco Gas and Electric Company of the former's common stock of a face amount equal to twice the face amount of all of the issued and outstanding shares of capital stock of the San Francisco Gas and Electric Company.

During the period from January 2, 1906, to and including June 30, 1914, the San Francisco Gas and Electric Company and the Pacific Gas and Electric Company made additions to and betterments of the property hereinbefore referred to as the San Francisco gas department properties of the plaintiff as shown on page 16 of plaintiff's Exhibit No. 58 and page 7 of plaintiff's Exhibit No. 72 which have been compiled, as I have already testified, from the books and records of the San Francisco Gas and Electric Company and the Pacific Gas and Electric Company and which I believe to be substantially correct.

NOTE.—The following table with explanatory notes has been prepared from page 7 of plaintiff's Exhibit No. 72 and page 16 of plaintiff's Exhibit No. 58 as explained in the testimony of Mr. M. H. Bridges, and shows the gross and net additions to the plaintiff's San Francisco gas department properties substantially in accordance with the testimony of Mr. Bridges. The items shown for the first half of the year 1914 were obtained by taking one half of the corresponding items for the entire calendar year 1914 as shown on page 7 of plaintiff's Exhibit No. 72. This table is as follows:

1880 *Table Showing Gross and Net Additions to San Francisco Gas Department Properties From January 1, 1906, to June 30, 1914.*

Year.	1. Gross expenditures for additions and betterments.	2. Deductions for property abandoned be- cause of cur- rent ordinary depreciation, etc. See note below.	3. Additions and betterments, less deduc- tions for aban- doned property.
1906	\$989,185.96	\$345.00	<i>a</i> \$988,840.96
1907	736,324.92	77,981.13	<i>b</i> 658,343.79
1908	299,724.04	153,666.85	146,057.19
1909	404,891.65	135,455.11	269,436.54
1910	625,313.23	147,779.23	477,534.00
1911	2,890,220.85	161,580.74	<i>c</i> 2,728,640.11
1912	1,021,051.23	73,300.35	947,750.88
1913	459,827.88	92,978.11	366,849.77
1914 ½ yr. ...	165,053.59	45,522.84	119,530.75
Totals ..	\$7,591,593.35	\$888,609.36	\$6,702,983.99

NOTE.—The amounts shown in column 2 do not include any losses due to the fire and earthquake of April, 1906.

a. This item includes the following:

1. The sum of \$175,732.13, the cost of construction of certain oil gas generators which were constructed by California Gas Company in the early part of the year 1906 and almost immediately conveyed to San Francisco Gas and Electric Company at cost;

2. The sum of \$429,844.75, the cost of construction of the Martin Station gas plant which was constructed by San Mateo Power Company, a subsidiary corporation of the Pacific Gas and Electric Company, in 1905 and 1906 and which, by mesne conveyances, passed to the Pacific Gas and Electric Company January 28, 1908; and

3. The sum of \$308,255.22, which was expended for rehabilitating properties damaged by fire and earthquake in April, 1906.

b. This item includes the sum of \$366,684.43 which was expended for rehabilitation of properties damaged by fire and earthquake in 1906.

c. This item includes the sum of \$2,151,268.35 which represents the price in money paid and bonds assumed of the gas properties which were purchased by San Francisco Gas and Electric Company from Metropolitan Light and Power Company and Metropolitan Gas Corporation in November, 1911, and which were conveyed to the purchaser by deed dated November 29, 1911.

1881 Mr. E. B. HENLEY, manager of the plaintiff's land department, recalled for the plaintiff, testified in substance as follows:

Among the plaintiff's lands in San Francisco are those which were formerly occupied by the gas manufacturing plant of the Pacific Gas Improvement Company and the North Beach plant of the San Francisco Gas and Electric Company. Those lands have not been used as a part of the operative gas properties of the San Francisco Gas and Electric Company or the Pacific Gas and Electric Company since the earthquake and fire of April 18, 1906. In November, 1914, I inventoried and appraised these parcels of land together with certain other lands which were formerly used in the electric business of said companies but which have since become non-operative. In my opinion the value of the aforesaid lands which were formerly used as sites for gas manufacturing plants but which are now classed as non-operative was at the time of my appraisal, namely, November, 1914, \$295,423.00. In my opinion, the lands now classed as non-operative electric properties were at the time of my said appraisal worth the sum of \$306,000.00. There is one other parcel of land which was formerly used partly by the plaintiff's gas department and partly by its electric department but which is now classed as non-operative. In my opinion, the value of the last mentioned parcel of land in November, 1914, was the sum of \$100,000.00.

1881½

VOLUME 7.

In the United States District Court, Northern District of California,
Second Division.

Equity. Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

*Report and Supplemental Report of H. M. Wright, Standing Master
in Chancery.*

Filed: March 2, 1920.

W. B. MALING,
Clerk.

By J. A. SCHAERTZER,
Deputy Clerk.

W. B. Bosley, Esq., Attorney for Plaintiff.

George Lull, Esq., Robert M. Searls, Esq., John J. Dailey, Esq.,
Attorneys for Defendants.

1882 In the United States District Court, Northern District of California, Second Division.

Equity. Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

Master's Report on Final Hearing.

To the Honorable the Judges of the United States District Court, Northern District of California:

The report of H. M. Wright, Master in Chancery of said court, respectfully shows as follows:

On December 15, 1916, the following stipulation and order was entered:

Whereas, the above-entitled and numbered causes are suits in equity involving the validity of gas-rate ordinances passed by the Board of Supervisors of the City and County of San Francisco for the fiscal years 1913-14, 1914-15 and 1915-16, respectively; and

Whereas, the same, or nearly the same, issues are involved in each of said causes; and

Whereas, said causes are proper matters for reference to the Standing Master in Chancery of this court;

Now, therefore, it is hereby stipulated that an order may be made consolidating the above-entitled cases for trial and that the same may then be referred for hearing to the Standing Master in Chancery.

WM. B. BOSLEY,

Solicitor for Complainant.

PERCY V. LONG,

City Attorney;

ROBERT M. SEARLS,

Assistant City Attorney,

Solicitors for Defendants.

It is so ordered.

WM. C. VAN FLEET,

U. S. District Judge.

1883 On April 16, 1917, I was attended by W. B. Bosley, Esq., attorney for the plaintiff, and Robert M. Searls, Esq., special counsel, and John J. Dailey, Esq., Assistant City Attorney, appearing as attorneys for the defendants. The hearings, beginning then, continued, with frequent recesses, until February 11, 1918. Thereupon argument was heard and the matter was submitted on February, 26, 1918. During the hearing documentary exhibits, numbered consecutively from 1 to 111, were received in evidence and one

exhibit containing statistics offered by plaintiff was rejected but was marked by me for identification. At the request of the parties the proceedings and the argument were stenographically reported and transcribed by Charles R. Gagan and Edward W. Lehner, the testimony containing 3,877 pages of typewriting in eight bound volumes, and the argument, containing 999 pages, in eleven pamphlet volumes. Each party filed with me an index to the testimony and the exhibits. All the above are herewith separately returned. The said testimony and exhibits, aided by a trip of inspection of the gas works of plaintiff, taken by the Master in the company of all the counsel early in the hearing, constitute all the evidence upon which this report is based.

Nature of the Litigation.

These three suits are brought to declare void, under the Fourteenth Amendment to the Constitution of the United States, three certain ordinances of the Board of Supervisors of the City and County of San Francisco, fixing maximum rates for the service of gas. Under the Constitution and laws of the State of California, in force during the period in question, it was the duty of such board to fix these rates in February of each year, effective for one year after the 1st of July following, and these ordinances were accordingly passed in 1913, 1914 and 1915. It is alleged in each bill of complaint that the rates were not justly compensatory and, therefore, deprived plaintiff of its property without due process of law. The three bills were filed July 18, 1913, July 3, 1914, and July 2, 1915; in due course in each case orders to show cause why an injunction pendente lite should not issue were made, with restraining orders pending that hearing. In the first case, No. 27, upon motion of the defendant and consent of plaintiff, a reference of the order to show cause was made to me as Master in Chancery, and a report made recommending that the preliminary injunction be granted.

1884 Exceptions were filed, but were not pressed, and in time were dropped from the calendar; so that the report has never been passed on by the court, and the cause has rested on the original restraining order. In the two later cases, likewise, hearings on the orders to show cause were repeatedly continued and finally dropped, the restraining orders continuing in force. The ordinances, in consequence, have never been in effect.

In these cases the charges collected by plaintiff in excess of the ordinance rates have not been impounded, as has been the practice in some cases of like character, but, as a condition of the restraining orders, the plaintiff has been required to file with the clerk monthly statements covering each consumer's account, with his bills computed both at the ordinance rates and the rates actually charged and collected, and has executed bonds to secure the repayment of the excess, with interest at the rate of 7 per cent per annum, in the event the bills are dismissed. The amounts thus involved are stated in plaintiff's Exhibit 72 (defendant's Exhibits 85, 86, 87 varying slightly) in the following sums: 1913-14, \$284,-

325.71; 1914-15, \$362,077.46; 1915-16, \$378,380.65. By a written stipulation filed in case 190 it was agreed by counsel that charges between the period July 1, 1916, and the effective date of the rates to be fixed by the State Railroad Commission should be disposed of by the decree in that case. (Tr., 2,659.) I am informed by counsel that the amount thus involved between July 1, 1916, and October 29, 1917, is \$447,777.65. The total principal sum involved is thus \$1,472,561.47, and this amount, if the bills are dismissed, will be very greatly increased by interest at 7 per cent from date of receipt of each item to the date of payment thereof. I make this statement, not as a finding, but as an estimate to gauge the importance of the litigation. It explains, in some degree, the very elaborate presentation in the evidence.

The Rate Schedules.

The ordinances complained of are annexed to the bills of complaint and are substantially identical in terms. The maximum charge was fixed at \$.75 a thousand cubic feet; the ordinance fixing no graduated schedule for larger consumption, and, as is obvious, leaving the utility company free to make such lower charges as it saw fit.

The charges as established by the plaintiff, after the restraining orders and as collected, except where modified by contract in individual cases, were (Exhibit 49):

1885 After September 1, 1913, and until July 1, 1915,

85¢ per M cu. ft. to 20,000 cu. ft.;
 82½¢ per M cu. ft. for 20,000-30,000 cu. ft.;
 80¢ per M cu. ft. for 30,000-40,000 cu. ft.;
 77½¢ per M cu. ft. for 40,000-50,000 cu. ft.;
 75¢ per M cu. ft. for 50,000 and over cu. ft.;

After July 1, 1915,

85¢ per M cu. ft. for the 1st 16,500 cu. ft.;
 70¢ per M cu. ft. for the next 33,500 cu. ft.;
 65¢ per M cu. ft. for the next 100,000 cu. ft.;
 60¢ per M cu. ft. for the next 200,000 cu. ft.;
 55¢ per M cu. ft. for the excess over 350,000 cu. ft.

It is thus apparent that in the years 1913-14 and 1914-15 it was the consumers of less than 50,000 cubic feet of gas a month who would have been affected by the city's ordinance. And the same is true of the year 1915-16; for under the ordinance 50,000 feet of gas would cost \$37.50 and under the company's schedule \$37.475. The differences in the consumers' total monthly bills as affected by the ordinance schedules and those charged by the plaintiff can best be seen by constructing a table applying the rates to various figures of gas consumption:

Consumption, cu. feet.	Charge at Co.'s rate, 1913-15.	Charge at Co.'s rate, 1915-16.	Charge at City's rate, 1913-16.	Difference.	
				1913-15.	1915-16.
1,000	.85	.85	.75	— .10	— .10
2,000	1.70	1.70	1.50	— .20	— .20
3,000	2.55	2.55	2.25	— .30	— .30
6,000	5.10	5.10	4.50	— .60	— .60
10,000	8.50	8.50	7.50	—1.00	— 1.00
15,000	12.75	12.75	11.25	—1.50	— 1.50
16,500	14.025	14.025	12.375	—1.65	— 1.65
20,000	16.50	16.475	15.00	—1.50	— 1.475
25,000	20.625	19.975	18.75	—1.875	— 1.225
30,000	24.00	23.475	22.50	—1.50	— .975
40,000	31.00	30.475	30.00	—1.00	— .475
45,000	34.875	33.975	33.75	—1.125	— .225
50,000	37.50	37.475	37.50	.00	+ .025
150,000	112.50	102.475	112.50	.00	+10.025
350,000	262.50	222.475	262.50	.00	+40.025
450,000	337.50	277.475	337.50	.00	+60.025

NOTE.—The sign (—) indicates amount of consumer's monthly saving by application of city's rate. The sign (+) indicates amount of consumer's monthly saving by application of company's rate.

1886 It is thus seen that during the years 1913-14 and 1914-15 the maximum monthly reduction or consumer's saving in any individual case under the city's rate-fixing ordinance was \$1.875 to the user of 25,000 cubic feet of gas; and during 1915-16 was \$1.65 to the user of 16,500 cubic feet of gas. But such figures of consumption are comparatively large and the number of such consumers a small minority. Approximately 70 per cent of the consumers used 3,000 feet or less a month (Exhibit 69, p. 6); and to such as these the saving in his gas bill would be 30 cents or less a month, or a cent or less a day, a sum inconsequential from any consumer's view-point. One's first impression, therefore, is that this very difficult and expensive litigation is of little moment to the public, and that public regulation of such a sort does more harm than good in the effect it has of unsettling the credit and investment standing of utility companies. On the other hand, the city properly replies that even such results would be a matter of legislative policy; that there is great importance in upholding the action of the co-ordinate legislative branch of the government, provided it assures a reasonable return on the value of the property employed in the public service. There is no doubt that the city is right, under the authorities. To this the plaintiff rejoins that it is the reasonable value of the gas, rather than of the property which produces it, which the Constitution protects and that the free and increasing public demand for the gas at the company's prices shows that the rates are reasonable and a reduction therefore unjustifiable. I shall refer to this novel contention later on. Of course, it is obvious that while, as stated, the individual consumer's money stake in this

litigation is very small, the company's stake is large, namely, about one and a half million dollars for the three suits here under consideration.

Some Difficulties of the Litigation.

At the outset of the hearing I anticipated that this case might be disposed of without unusual difficulty by reason of the extent to which the parties had reached agreements out of court. This hope has not been realized; on the contrary, this report has been in many respects more difficult to prepare than any other of like character in my experience.

One of these difficulties arises from the nature and extent of the plaintiff's business. The Pacific Gas and Electric Company supplies gas, electric energy and, in a minor degree, steam, to consumers in San Francisco. It is the only purveyor of gas in that city. But a large part of its business lies elsewhere, throughout some thirty different counties in the central part of California. It owns gas works in a number of cities, and great hydro-electric and steam plants generating electricity for light and power to be served to many towns and rural communities. It owns a street railway in Sacramento, and a water system in the foothills of the Sierras. It is thus a business unit which attains efficiency and economies in operation by reason of its size, and stability by reason of its diversification of product and of markets. It would seem fairly obvious that the rates of such an economic organism should be fixed as a whole, however great the task; for this would be more likely to assure proper apportionment of revenues and costs, bearing in mind economic differences between various localities. The company has capital which is devoted to all its varied activities, as well as capital devoted exclusively to making and delivering gas in San Francisco, and incurs expense, like the salaries of general officers, for example, that concerns all its business, as well as expense that can be allocated to the San Francisco gas department alone. Our present task is to unscramble this business unit and find the capital, the revenue, and the costs of the gas department in San Francisco. This involves an apportionment: Shall it be on a revenue basis or a consumer basis? And other difficulties will be presented arising from this situation.

A serious difficulty arises in part from the length, but chiefly from the complexity, of the record of evidence. It presents an appalling array of figures. In some degree this was inevitable, for this, unlike a water company for example, is a manufacturing enterprise. But much of this could have been avoided by a predetermined plan of presentation and a complete preparation of the evidence before the hearing began. To acquire a proper familiarity with the facts since the submission has been a laborious task, performed piecemeal at odd times, with the aid of indexes to the evidence and the written argument; and the argument is only in degree less complex than the record.

Another respect in which the case is unusual is the number of novel principles which the very able counsel for plaintiff company has advanced. Briefly and bluntly, he believes that leading decisions of the Supreme Court have been made on insufficient presentation in the evidence, and that as to some of these he believes the 1888 decisions are misinterpreted. For example, he contends that it is the value of the gas or other public service that is protected by the Constitution, and not the property that produces that service. He contends that to the extent that the plant is to be valued, as an element in the rate-fixing procedure, it is not to be depreciated; and he especially contends that as to loss by obsolescence, it is to be reimbursed after replacement rather than by anticipation beforehand. And there are other novel propositions that will be referred to. I have considered it plaintiff's right to present evidence and argument that might be opposed to current well-settled rules; for while the Supreme Court has usually followed a familiar formula—that the public service company is entitled to a fair return on the fair present value of its property devoted to public use—it is also said that the ascertainment of value is not entirely a matter of formulas and that all sources of information are to be considered, and that each case must rest upon its special facts. *Minnesota Rate Cases*, 230 U. S. 352, 433. It is undoubtedly true that the whole subject of rate-fixing is in process of development. The material for that development in the shape of evidence must be provided by the trial court; whether, however, the trial court shall, in effect, overrule the Supreme Court or rather leave it to that court to announce radical changes in essential doctrine, is quite another question. It has been the writer's special official duty for a number of years past to assist this court to clear away the mass of rate-fixing litigation with which this district has, unhappily, been burdened; and in these reports, for example, that in *Contra Costa Water Co. vs. Oakland*, and especially in the elaborate printed report in *Spring Valley Water Company vs. San Francisco*, the careful reader will note that it has been my aim, first to determine with precision the law as laid down by the Supreme Court, and, second, to apply it to the case in hand; and this without regard to whether, in my own view, the law had been developed on correct lines or not. It is not easy to change this attitude, or to abandon the aid which a rather hard-won familiarity with these principles affords.

Underlying Legal and Economic Principles.

The principles underlying the determination of this class of cases, so far as the courts have determined them, are expressed thus by Mr. Justice Hughes in the *Minnesota Rate Cases*, 230 U. S. 352, 433:

1889 "The inquiry is whether the state has overstepped the constitutional limit by making the rates so unreasonably low that the carriers are deprived of their property without due process of law, and denied the equal protection of the laws.

"The property of the railroad corporation has been devoted to a public use. There is always the obligation springing from the nature of the business in which it is engaged—which private exigency may not be permitted to ignore—that there shall not be an exorbitant charge for the service rendered. But the state has not seen fit to undertake the service itself; and the private property embarked in it is not placed at the mercy of legislative caprice. It rests secure under the constitutional protection which extends not merely to the title, but to the right to receive just compensation for the service given to the public. (Citations.)

"In determining whether that right has been denied, each case must rest upon its special facts. But the general principles which are applicable in a case of this character have been set forth in the decisions.

"(1) The basis of calculation is the 'fair value of the property' used for the convenience of the public. *Smyth vs. Ames*, 169 U. S. 456. Or, as it was put in *San Diego Land and Town Co. vs. National City*, 174 U. S. 757: 'What the company is entitled to demand, in order that it may have just compensation, is a fair return upon the reasonable value of the property at the time it is being used for the public.' See, also, *San Diego L. & T. Co. vs. Jasper*, 189 U. S. 439; *Willcox vs. Consolidated Gas Co.*, 212 U. S. 19, 41.

"(2) The ascertainment of that value is not controlled by artificial rules. It is not a matter of formulas, but there must be a reasonable judgment, having its basis in a proper consideration of all relevant facts."

It is, of course, familiar matter to all of us that a trial court's usual procedure in applying these principles is, first, to make an appraisal of the present value of the capital assets devoted to the service of the public; second, to make an estimate of the revenues which would be earned under rates of charge prescribed by the legislation complained of; third, to determine the expenditures necessary to produce that revenue, including maintenance, reserves and the like; and finally to determine whether the net 1890 divisible revenue thus ascertained shows a reasonable rate of interest as applied to the value of the capital assets.

It is, of course, obvious that this process of reasoning emphasizes the plant, the capital assets, as the property protected against confiscation by the Fourteenth Amendment. Plaintiff's counsel sees in this a mistaken view; his idea is that it is the gas, or water, or service rendered the public, which is taken by the state without due process of law when it fixes an unreasonable rate. That the courts might have taken this view is plain; and counsel believes that the reason they did not was that the first cases of this sort were concerned with rates of warehouses and railroads, where a service was rendered, and not cases where a commodity was furnished the public. However this may be, the question here is

whether we get any assistance by stating our problem thus: Was 75 cents a reasonable price for gas per thousand feet? There is no way in which this can be answered except by determining costs of its production, including profit upon the capital employed. And this, in fact, is just what plaintiff does, and to that extent follows the classic formula of the courts which counsel complains of. This is not, however, equivalent to saying that plaintiff's counsel makes no use whatever of his idea that the reasonable price of gas is the primary thing; he makes use of it in treating the problems of depreciation, of past profits and reserves, of duplication of facilities, and other questions. The discussion may therefore be delayed until such matters are severally considered.

But, largely as a foundation for this theory, plaintiff produced evidence of the principles of economics underlying the determination of reasonable rates to be charged by public utilities. This evidence was given by Fred R. Fairchild, professor of political economy in Yale University. (Tr. 2541-2656.) It is a valuable presentation. I cannot do justice to it within the reasonable limits of space which this report demands. I must be satisfied with a rather brief synopsis:

The principles which determine the value of a commodity currently exchanged in the market in a private business and those which determine the rate of charge for the service given by a public utility company are, he says, the same. And first he considers cases where competition exists. The market price is determined by supply and demand. The utility to the buyer governs the demand;

the cost (which includes a profit) to the producer governs the supply. The market price is determined when demand and supply are equal, and at that point the utility of an article tends to equal its cost. Every voluntary exchange is an advantage to both buyer and seller, otherwise it would not take place—both profit. But furthermore, utility varies with different purchasers at the same market price, it being of more worth to some than to others. And in like manner, cost varies among producers by reason of differing efficiency, situation and the like. Therefore, the utility and the cost, which become equal in the market price, are both marginal amounts; the marginal cost being the cost to the least efficient producer whose contribution is necessary to supply the demand, and the marginal utility being the utility to the last purchaser, to whom it is just worth while to pay the market price. And it is also to be noted that in every normal exchange there will thus exist a consumers' surplus to every purchaser and a producers' surplus to every seller. The price thus reached in free market conditions must be conceded to be reasonable, since it satisfies all. And there is no reason why the same should not be true where the competing businesses engaged in the supply end are public utilities subject to regulation by the state. Professor Fairchild therefore concludes that in cases where competition exists there is no occasion for public regulation to interfere with the free play of economic forces which determine the reasonable rate, except to prevent unjust discrimination among consumers.

But where there is not free competition, and the supply is fur-

nished under conditions of partial or, more often, total monopoly, there is not the same presumption of reasonableness which attaches to rates fixed in a competitive market. If the monopoly is actuated purely by economic motives, it will seek to fix a price which, in view of the conditions of cost and demand, will give it the maximum possible net earnings; this is the principle of charging what the traffic will bear. But the greater freedom which the monopoly thus has may call for legislative regulation by the state. By what principles should this regulation be governed? I understand Professor Fairchild to say that the state should act as if competition existed—not “cut-throat” or destructive, but the normal situation where all profit by the business (Tr. 2586-7). This means that consideration should be had of the relation of the reasonable rate or price to cost (the supply side) and its relation to utility (the demand side). He considers first the relation of reasonable rates to cost.

1892 In any business, private or public, there will be lean years and fat years; years when the hazards of the business produce losses, and years when the same hazards, improvements in arts of manufacture, and skill and zeal on the part of the owner, result in unusual profits. This is normal and proper. But in the long run, taking good years and bad, it may be said that the reasonable rate tends to equal the cost. The problem, then, in fixing a rate by legislative enactment, as an important item in the complete inquiry, is to determine cost of production. The term “cost” he uses “as meaning all costs necessary to deliver the commodity in question at the market, including the normal profit necessary to induce the owner to devote his capital and energies to the business” (Tr. 2560). The items making up the total cost are the following: (1) Cost of operation; (2) of maintenance; (3) of replacement; (4) of developing the business as a going concern; (5) of creating and maintaining an organization, of general oversight and management, of experiment, invention, etc.; (6) a reasonable return upon the necessary capital; (7) a reasonable reward for the labor of direction and oversight of the owner.

By way of comment, I should say that the usual practice of courts—certainly that of the writer—has been to consider items (1), (2) and probably (5) under the general designation of operating expense. Item (4) would appear either as operating expense so far as it might cover cost of getting new business, or would be covered by the addition to the capital value usually called going value. Item (7), so far as it is not included in operating expense as salaries, is usually taken care of in determining the rate of return upon the capital.

In connection with the discussion of the return on the capital employed, both Professor Fairchild and plaintiff's counsel take exception to the term “value of the property” as the base upon which the return in net revenues shall be estimated. The value of a property, they say, depends upon its future earnings; in other words, it is the discounted value, the present worth, of all its expected future earnings. It is not measured by its cost or by the cost of its present reproduction, though that comes closer. (Tr., 2551.) “If the

whole business were sold, we could say that the sale price represented the value, but such sales practically never occur." The judgment of investors in stocks and bonds, as shown by market reports, may be of assistance, but is often untrustworthy. An appraisal is the result of an effort of judgment, and liable, therefore, to human error. Equally uncertain is the effort to determine value by reference to future earnings. For to estimate those earnings there must be considered the character of the plant, the future supply and prices of materials and of labor, the chances of competition, the probabilities of changing demand, the commercial and moral stability of the community, the attitude of the rate-fixing authorities, the wisdom of the courts, etc. It seems to be admitted that we have here no adequate working formula.

Why, then, plaintiff's objection to the usual statement of the rule? The upshot of it seems to be that for the term "value" he substitutes "rating base"—a result that hardly justifies the discussion. He uses it affirmatively to found an argument against deduction from capital, or "rating base," on account of depreciation, and other arguments upon questions which will be discussed later in this report.

Professor Fairchild next considers the relation of the reasonable rate to the utility of the service—the factor which governs demand. (Tr., 2581 et seq.) The question is whether the consumer gets much or little for his money. He suggests the following lines of investigation: (1) How widespread is the use of the service? (2) Is the service increasing or decreasing? (3) Is it extending to new uses? (4) Is the community growing? (5) How does the utility of the service compare with that of substitutes? (6) How does the rate compare with rates for similar service in other communities? (7) How does the rate and changes in it compare with amounts and history of the general level of commodity prices? (8) What is the intrinsic quality of the service, and is it improving or deteriorating? (9) How do the consumers regard the service and the rate?

Professor Fairchild concludes his discussion thus:

"It must be emphasized that since a reasonable rate must tend in the long run to equal the cost of the service, any amount of evidence from the side of utility alone would not determine the reasonableness of the rate. Both cost and utility must be considered."

It seems to me, in view of the lack of precision in the tests which must be employed in determining the reasonableness of a rate from the side of utility, that considerations of utility will be more helpful to the rate-fixing body than to the court which determines the question of the constitutionality of its action. Thus, a rate-fixing body, in a given case, might properly deny a reduction in the price of gas below 85 cents, if the facts showed a satisfied community, an increasing consumption and other indications of ample utility, without undertaking the enormous task of determination of costs by an appraisement, etc., and that though the costs might be so low, through favoring circumstances of situation, management or otherwise, that the rate gave a net return of 20 per cent. But if the state body, upon the same considerations, reduced the rate

to 75 cents, and the courts were appealed to, they could make no decision guided by these vague criteria of utility, and would turn to the cost factors, and would undoubtedly deny relief. To sum up, a court's decision will, as a rule, be guided by consideration of the cost of production.

I conclude that this economic discussion, and the emphasis laid upon the reasonable rate as the thing of importance, is very useful in a general way, but in a general way only. Certainly, the principles of the science of economics lie at the foundation of such matters as these; and neither acts of Congress nor decisions of the Supreme Court can stand against them for all time. But I believe that the Supreme Court's formula of "fair return on the fair value of the property" is not only the best working principle, but that it is economically correct. All courts recognize that earning power is the final test of value, but obviously that test is impossible when you throw a monkey-wrench into the normal economic machinery by regulating the rate of charge by law. As an alternative the courts says we will determine the value of the property in the public service by finding the cost of making, buying and assembling that plant and business again. In other words, the valuation is for all practical purposes a condemnation. I am not at all convinced that the usual formula has not worked well and justly.

Professor Fairchild has done a service in emphasizing at many points in his discussion the uncertainty, the approximate character, of determining the value of anything not currently bought and sold; the difficulty extends to a lot of land equally as to a complex public service plant. And when a Federal Court, guided by the principle that the state action must not be set aside except upon clear proof, attempts the task of valuation, it will decide many questions of doubt in favor of the state. The result of this logical process will normally be an appraisement and an estimate of proper net return lower than might be justified, could the matter be scientifically weighed or measured. And, furthermore, it not infrequently happens that the character of proof upon which the trial court acts—and must act—is such that a reviewing court may be moved to further reductions.

I shall now proceed to the appraisement of the lands and plant of plaintiff. It will then be in order to deduct the values of properties not used or properly employed, and to take account of depreciation of value of structures. Following that will come the valuation of the working capital, the determination of going value and the discussion of franchise value. The appraisement thus made will then be considered from various other points of view to determine whether it constitutes the fair value, or proper rating base, upon which the reasonableness of the net revenue is to be determined.

Lands.

The lands of the plaintiff have been appraised at their market value, following the rule laid down in the Minnesota Rate Cases. No expense of acquisition, as by purchase or condemnation, or

interest pending utilization, is here included. In the Minnesota cases such additions were disapproved; but it is possible that this rule was made with reference to the peculiarities of the valuation methods in that case. A conservative attitude dictates the course here followed.

The witnesses for the parties have agreed on these values, as follows (Exhibits 1 and 2):

During years 1913-14 and 1914-15.....	\$900,816.92
During year 1915-16, including additional property..	931,748.71

The city's objection to the full valuation of Martin Station naturally includes the land at that point, as well as the structures. That question will be passed on later.

Manufacturing and Distributing Plant.

Under this title is comprised all the structural property of plaintiff in the San Francisco gas department.

The engineer witnesses who presented the appraisal were E. C. Jones for the plaintiff and N. Randall Ellis for the city. Mr. Jones, chief gas engineer of the Pacific Gas and Electric Company, is one of the leading men in his profession in this country. In addition to this technical equipment he possesses honesty of mind, a conservative and well-balanced judgment and a fair spirit of approach toward controverted questions. Mr. Ellis, chief valuation engineer for the city, has not had a broad experience with gas properties, but has had much to do with construction work of a similar character. He, likewise, is fair and just in his attitude to the problems of appraisals. From such men the court has a right to expect what is here presented, an agreed appraisal. Mr. Jones completed his appraisal in 1914, and, with the approval of the company, presented it, with the supporting notes, to Mr. Ellis for examination by him and his staff. Mr. A. M. Hunt, a gas engineer of high standing, employed by the city, assisted in the conference. The final appraisal followed mutual concessions.

In general, the appraisal is on the basis of cost of reproduction new in 1914, taking fair average prices over a term of years. For example, steel prices were taken over a six-year period, one year of abnormally high prices being omitted, and an average determined of the remaining. In a number of items shortly to be abandoned, the appraisal took account of the depreciated condition. Whether a further deduction should be made on account of current depreciation, not complete, will be discussed separately.

The agreement in the appraisal extends as far as reproduction cost (with the exceptions above noted), lacking overhead costs in the way of administrative expense and of interest, and as of the date June 30, 1914, at \$12,956,399.55. This is our starting point. The additional overhead is not agreed; this will first be determined. There must be added certain furniture, supplies and buildings not included in the Jones appraisal, and as to these there is

substantial agreement. Finally, additions and betterments must be considered and an average value for each year obtained. The results will be the reproduction cost in each year of the structural property in use. In a separate discussion there will then be considered the city's claims of deductions from these figures to cover property not useful or of abnormal value. After that we shall consider further deductions to cover depreciation.

Overhead.—Included in the agreed total of \$12,956,399.55 is an overhead percentage of 10 per cent upon construction items. I quote the transcript (p. 55):

"10% has been added to the value of all items in actual use, but this has not been added to material, supplies and other items to which it may not rightfully be applied. This addition of 1897 10% includes 6% for engineering and superintendence; 4% includes the cost of organizing a construction force, delays in shipment of material, excess freight, inclement weather, casualty insurance and piece-meal construction."

In other words, it is the overhead that would be expended under the direction of the chief engineer. (Tr., 95.)

But it is agreed that other costs would attend the construction of the works. These include general administrative expense, legal expense and taxes during the construction period. The percentage allowances for this item are divergent. In addition, interest must be allowed upon expenditures during the construction period. This is agreed upon at 3 per cent upon all other costs, including the overhead above referred to.

As to the overhead for administration, etc., Mr. Vincent, valuation engineer for plaintiff, uses 4 per cent compounded on the 10 per cent contained in the Jones appraisal. Mr. Ellis, for the city, uses 2 per cent not compounded. So far as this difference is concerned, the testimony in support of the respective estimates is not illuminating. I shall accept the estimate of the city's witness. Both witnesses deduct from the Jones appraisal \$224,064.54, reproduction cost of materials and supplies, tools, furniture, automobiles, etc., as property to which the additional overhead allowance is not applicable. It is true that Mr. Jones did not add 10 per cent to these items, the reason being, doubtless, that such expenditures would not be made under direction of the chief engineer, but it is not apparent to me why they should not be subject to the percentage to cover administration, legal expense, taxation, etc., and especially to the percentage for interest during the construction period. Likewise, Mr. Jones did not apply his 10 per cent to \$1,127,169.65 of pavement over mains. (Exhibit 3, pp. 285, 288.) I recall no evidence as to the reason for this omission, but it may readily be surmised that the base prices used were for paving done by the city, thus involving no engineering oversight by the company. Perhaps for this reason also Mr. Ellis did not apply to this pavement his 2 per cent allowance, but did not allow interest during construction. I shall follow him in this, but I shall also allow

interest on the \$224,064.54 of supplies, etc. These would be bought throughout any construction period and should carry interest.

1898 The plaintiff's total overhead allowance is thus 17.832 per cent of the base reproduction costs, the city's 15.36 per cent, both these being applied to less than the total reproduction costs, and the respective estimates to differing bases. Even the higher percentage seems low as compared with overhead allowances in other appraisements made in proceedings before me, and elsewhere. The lower allowance now made does not impugn the correctness of findings as to overhead made in other cases. It illustrates the fact that one case or one construction job is not a precedent for another in regard to such allowances. Overhead allowances vary with the size of the job, the time requisite for construction, the degree to which the engineering problems are novel and difficult, or, on the contrary, along standardized lines, and the like.

The calculation whereby the overhead addition is made to the agreed figure for June 30, 1914, of \$12,956,399.55 is, therefore, as follows (compare Exhibits 4, 5, 9, 10, 11):

Jones appraisal as of June 30, 1914, adjusted.... \$12,956,399.55

Deduct items not carrying overhead:

Supplies, etc.....	\$224,064.54	
Paving	1,127,169.65	
		<hr/> 1,351,234.19
Total of items carrying overhead.....		\$11,605,165.36
Total of above, less 10% overhead (Exhibit 10, p. 2)		10,550,456.56
2% administration, legal, taxes, etc., on above....		211,009.13
Add Jones appraisal, including 10% overhead....		<hr/> 12,956,399.55
Total Jones appraisal with administrative overhead		\$13,167,408.68
Add 3% interest during construction.....		<hr/> 395,022.26
Total Jones appraisal, with additional overhead...		\$13,562,430.94
Add property not included in Jones appraisal (Exhibit 11, p. 1).....		<hr/> 156,969.10
Total reproduction cost, all structural property as of June 30, 1914.....		<hr/> 13,719,400.04

This figure therefore represents the reproduction cost of all structural property actually in use on June 30, 1914. Our next task is to determine the average value, on the reproduction cost basis, for the three years beginning on July 1st of 1913, 1914 and 1915. This involves the ascertainment of additions and betterments, less abandonments in each of these years.

1899 Average Value of Structures, 1913-14.—The net additions and betterments for this year are agreed. (Exhibit 5, 11.) The computation follows:

Value June 30, 1914, as determined.....	\$13,719,400.04
Less net additions, etc., as agreed.....	238,208.06
Value June 30, 1913.....	\$13,481,191.98
Average undepreciated value, 1913-14, being average of above two values.....	13,600,296.01

Average Value of Structures, 1914-15.—The net additions and betterments for this year are shown in plaintiff's Exhibit 6 and defendant's Exhibit 12. The additions as computed by the city are, roughly, \$53,000 in excess of plaintiff's figure. The difference, however, seems to result solely from necessary adjustments consequent on the city's method of taking out its claimed exclusions of useless or overvalued structures at this point. As I have found it preferable to defer that question until later, I shall take plaintiff's figures for net additions. The computation for average value, 1914-15, is as follows:

Value June 30, 1914, as above.....	\$13,719,400.04
Add net additions, etc.....	268,140.93
Value as of June 30, 1915.....	\$13,987,540.97
Average value of structures, 1914-15.....	13,853,470.50

Average Value of Structures, 1915-16.—See Exhibits 7 and 13. The situation is the same as in the exhibits last referred to. I take plaintiff's figures, disregarding certain possible errors involving a few hundred dollars.

The computation follows:

Value as of June 30, 1915, as above.....	\$13,987,540.97
Deduct Martin station.....	\$495,760.40
Add new sets at Potrero—net charge capital	241,812.59
Net deduction.....	\$253,947.81
Adjusted valuation July 1, 1915.....	\$13,733,593.16
Add net additions and betterments.....	463,197.68
1900 Value as of June 30, 1916.....	\$14,196,790.84
Average value of structures, 1915-16.....	13,965,192.00

Summary.—The figures for these three years, viz., 1913-14, \$13,600,296.01; 1914-15, \$13,853,470.50; 1915-16, \$13,965,192.00, represent the reconstruction cost of the structures actually in use, without deduction for deterioration or approaching disuse (with the

minor exceptions referred to). The word "value" is loosely used in the tables in the interest of brevity.

In applying overhead, nothing has been included that would affect the question of going value, hereafter discussed. Interest has been carried only to the point of completion of an operating unit, and deficits, if any, in the operating period are still to be taken care of.

Exclusions from Capital.

The city contends that for various reasons that will appear, the Jones basic figures for reproduction cost new in the three years should be reduced \$1,643,192.07 (Exhibit 10, p. 6), less \$225,000 subsequently conceded for the first two years as an allowance for Martin station. These claimed exclusions will be considered in order.

1. Martin Station.—This is valued in the Jones appraisal at \$472,725.77; and with additional overhead, the figure becomes \$495,760.40. The city deducts this amount, but adds \$225,000, assumed cost of two generators at the Potrero, as an equivalent. The net deduction by the city is thus \$270,760.40. On the other hand, Mr. Jones, for the plaintiff, in considering depreciation (Exhibit 43) reduces his valuation 40 per cent, leaving a value, with all overhead, of \$297,456.24. This, plaintiff claims to be entitled to valuation as capital in use. The city does not further depreciate its figure of \$225,000, and consequently the net final difference between the parties in this item is \$72,456.24. The deduction from capital here claimed is for the first two years only. It is shown above that when Martin station was deducted from the appraisal in 1915-16, there was added for new generators at the Potrero \$241,812.59. This, it seems to me, should be the city's figure instead of \$225,000, involving an additional allowance of \$16,812.59. The net difference between the parties, a measure to some extent of the real importance of the controversy, is thus reduced to \$55,643.65. To 1901 this, again should be added the value of the real estate, \$12,180 (Exhibit 2), which the city also deducts.

Martin station was built in 1905 just across the county line by the California Gas & Electric Corporation. (Tr., 77 et seq.) Its purpose was to manufacture gas to supply San Francisco, and also to supply gas engines for generating electricity, both gas and electricity to be sold in competition with the San Francisco Gas and Electric Company. Later, in 1905 or early in 1906, the newly formed Pacific Gas and Electric Company bought substantially all the stock of both these companies. The gas engines for developing electricity were a failure, but the gas generated was supplied to San Francisco. After the earthquake of 1906 Martin station was one of the main sources of supply for San Francisco, others of the principal stations having been wrecked. The amounts of gas supplied to San Francisco by this station were as follows: 1906, 723,287,295 cubic feet; 1907, 561,934,000 cubic feet; 1908, 206,267,000 cubic feet; 1909,

3,876,000 cubic feet; 1910, 1911, 1912, nothing; 1913, 17,295,000 cubic feet. In the later years it was thus a reserve or stand-by plant, kept under fire, ready to make gas. That it was a necessary standby is shown by the demand on it in January, 1913, when an accident occurred at one of the principal stations. During the winter of 1914-15 it was not under fire, but gas could be made on twenty-four hours' notice.

The city's objection is not that the plant was not useful and necessary, else it would not have allowed \$225,000 in the appraisal to cover this plant. Its position is rather that this unit of the plant is abnormal in value in consideration of the value of its service, and that the cost of service is thus abnormally increased. This abnormality is seen to exist partly in the remoteness of the plant, which makes necessary an increased expense to compress the gas; and partly in the fact that it is not up to date.

It seems to me the city's position is not well founded. So far as location is concerned, the plant was well located to serve the business down the peninsula; and, since San Francisco gets the advantages that flow from a large company operating in many contiguous fields, it ought, in fairness, to stand some of the disadvantages. Secondly, as in the case of paving laid by the city after the laying of the company's mains, the Supreme Court says we must regard the facts of history to obtain an equitable result; so here, we must note the fact that in 1905-6 this company bought a 1902 plant that then, and until about 1914, was modern in all respects. If its location was bad, that would seem to be one of the mistakes that the most prudent and able business men sometimes make. It is hardly fair to judge the matter by hindsight. So far as it is the city's position, explicitly or implicitly, that Martin station should have been abandoned and two new generators of the improved Jones type installed at the Potrero plant prior to the first year here involved, viz., 1913-14, it seems to me evident that, in fact, these generators were completed as early as they could have been, viz., in May, 1915. The record shows (Tr., 1229 et seq.) that Mr. Jones made the experiments at the Metropolitan station which resulted in the improved Jones generators and process in the year 1912. And yet two years and a half elapsed before these two notably superior generators at the Potrero were finished. Part of this period was consumed by unexpected delays in construction (Tr., 88); part, doubtless, by observation and experimentation with the Metropolitan installations, for it is plain, both by my inspection of the works and by the comparative efficiency records of the two plants, that the Potrero generators are an improvement on the Metropolitan sets.

All these considerations lead me to deny the city's deduction from capital. Whether the depreciation deducted by Mr. Jones is sufficient will be later considered.

2. Lampblack and Briquettes.—This has been appraised by me at \$13,115.69, including overhead covering interest during construction. The city does not deny that both lampblack and briquettes have the value assigned in the Jones appraisalment; it is expressly

agreed that it has. It is property that is both in use and is useful. But it is contended that this surplus stock of lampblack and briquettes is a by-product of gas-making, which has already been paid for by the consumer when operating expenses, including purchases of oil and collecting and piling of lampblack, have been allowed. To allow it in assets entitled to a return in the rates seems to the city a double allowance. It is to be noted that the city does not object to the supply of oil and gas on hand in the tanks; though, as to the gas, the city's objection was waived because of the small amount, in money, that was involved.

It should be understood that the design and the effect of recent progress in the art of gas-making has been to reduce the amount of lampblack produced. The less the lampblack, the more the valuable elements of the oil or coal are represented in the more valuable and desired product, the gas. The oil-gas process produces less lampblack than the water-gas process; the improved Jones process produces still less than the earlier oil-gas process. If there was a large amount produced, much of it could not be used or sold; it would be pure waste, of no value. But, as stated, that is not the fact here. The amount on hand, and the amount currently produced, is used under the boilers to make the necessary steam; it would be used in the water-gas generators at the Independent station, maintained as stand-by apparatus, and so a supply on hand is necessary, and some of the surplus, briquetted, is salable as fuel. If lampblack were not produced, oil or coal fuel would have to be bought and carried as part of the stock on hand.

The city's contention is plausible enough to mislead the judgment, as, I think, it has misled that of their counsel. From the accounting point of view, it is immaterial whether a product of the business is the principal thing or a by-product. The city concedes that if it had been sold the proceeds would properly appear in the revenue. And that implies that while it was on hand, awaiting sale (or, what is the same thing, awaiting consumption under the boilers to make steam), it must appear among the assets as material on hand, and, as such, entitled to a return. Suppose we view the matter from the standpoint of the reproduction cost theory. That means that another plant identical with this, hypothetically reproduced to do the service done by plaintiff's plant, would have to have on hand either lampblack or other fuel of equal value to subserve the purpose of this material. The deduction is denied.

3. Intermediate Overhead on Street Lamps.—The amount here involved, with the additional overhead, is \$14,941.30. In figuring the value of street lamps and services, Mr. Jones included an item "office and supervision" at \$1.6605 per lamp, later adding to the aggregate his 10 per cent overhead. In case of these lamps, Mr. Jones says, it is necessary to negotiate with the municipal authorities, and, on each occasion of installation, to send a man into the field to see that the lamp is not placed in front of a garage drive-

way and so forth. He considers that the 10 per cent overhead is not alone sufficient to take care of this. (Trs., 200-204.)

Mr. Ellis, for the city, "partly on the advice of counsel," he says (Tr., 532), deducts this item for two reasons. (Tr., 533.)

One is that the expense of such work is regularly carried in 1904 operating expense, and to allow it would duplicate charges against the consumer. The answer is that so is much else that is included by both sides in the overhead allowances made; taxes are an example. In other words, to think of this company as an operating unit is out of harmony with the thought that underlies the appraisement the parties have made, the reproduction cost method. Approaching it properly on that basis, Mr. Ellis points out that the locations would all be made practically as one job and that it was sufficiently covered in the agreed 10 per cent allowance. (Tr., 533.) Here is a square conflict of opinion with Mr. Jones, and though Mr. Jones has undoubtedly greater experience, I would feel sufficient doubt to allow the deduction.

But it seems to me that the city is foreclosed by its agreement to the Jones appraisal. This is not a case of deduction because the property concerned is not used or not useful; nor is it a case of abnormal plant value for the service performed. The deduction is made solely because the reproduction cost estimate is said to be too high. It seems to me plain that the engineers for both sides have agreed that the Jones appraisal (Exhibit 3) represented reproduction cost on June 30, 1914. The testimony shows that after Mr. Jones made his appraisal the various engineers came together and by a process of give and take reached the final result. (Jones, Tr., 35 et seq.; Ellis, Tr., 511.) Mr. Jones recalls that as to this item both he and Mr. Ellis wavered for several days. (Tr., 200, 201.) I must assume from the record that this matter was finally conceded by Mr. Ellis. I have no doubt of his fairness or sincerity in urging the deduction on the stand; it results from the intricacies of theories of valuation, and, possibly, as he says, on counsel's advice. The deduction is denied.

4. Commercial Arc Lamps.—The amount involved in this claimed exclusion, with additional overhead, is \$149,949.80. These gas arcs were owned by the company, were in use, and by that fact were useful. The reason urged for the deduction is that they are appliances not necessary to the manufacture or distribution of gas. It is said they should be eliminated from an inventory of capital and the revenue and expense pertaining thereto eliminated from the accounts. Counsel says:

"If the company desires to experiment with the gas appliance business that is their affair. If they make a profit, well and 1905 good; it should not be considered in connection with their regular gas business. If they make a loss they should pocket that and not attempt to charge it against their regular gas-rate payers."

The city finds that they were not a profitable investment for the company. This apparently is not denied, though the figures are not agreed to.

The company's witnesses on this matter were Mr. Jones (Tr., 196) and Mr. Holberton (Tr., 241), San Francisco district manager. The latter's testimony shows that in 1912 the company decided that the gas arcs were not being properly exploited by dealers and started their introduction. The company's purpose was to increase consumption of gas. These lamps, properly speaking, were not arcs, but gas lamps with a number of inverted mantles of the Welsbach type enclosed in a large globe. They were used in or before stores, saloons and restaurants, places that kept open at night, and in dwellings. In part they competed, and successfully, with electric light, and in large part added further illumination, this by reason of their cheapness. As the art of illumination then existed, they gave a great deal more light for the dollar spent than anything the company could offer in its electric department. (Tr., 243, 197.) The practice was to charge a rental and also a fixed charge for maintenance, the charge for the gas used being indicated on the regular meter. Mr. Holberton demonstrates satisfactorily that the system of ownership and maintenance by the company rather than by the consumer results in greater efficiency and in the saving of money to the consumer. (Tr., 245.) From between 500 and 1,000 in use prior to 1912 (Tr., 242) the gas arcs increased in number to 8,448 in 1913-14, 7,048 in 1914-15 and 6,265 in 1915-16. (Exhibit 99, p. 8.) The decrease shown in the later years was due to the successful competition of the new type Mazda electric lamp, having the filament enclosed in a nitrogen-filled bulb, a very brilliant illuminant which has become familiar. It is a striking example of the risks of the business due to obsolescence.

There is conflict in the evidence as to the financial success of the company's policy in this regard. Mr. Holberton says the gas arc is worth to the company 60 cents a month on the average in gas consumption, or \$7.20 a year. (Tr., 242.) Mr. Ellis, on the contrary, relying on an affidavit of Mr. Holberton on the hearing of the application for a preliminary injunction, to the effect that sales of gas had been increased by these arcs sixty million 1906 cubic feet of gas a year, estimates that each arc was worth in sales \$5.25 or \$5.95 a year, depending on whether the ordinance rate or the rate charged is applied in the computation. (Exhibit 99, p. 8.) He also presented figures for the year 1915 which showed that the expenses, including the depreciation allowances, exceeded the revenue from the arcs. (Tr., 536.) It is not necessary to determine this conflict.

It seems to me now, as it did on the hearing of the application for a preliminary injunction, that the principle which dictates the city's claim for deduction of these assets is not well founded. It is conceded by the city that expenditures for solicitors, advertising, etc., adapted to induce increased consumption of gas, are proper operating expenses. For while economies in the amounts spent for labor and materials, and in improved processes of manufacture, will enable

reduction in rates charged by direct reduction in costs, it is also apparent, as a principle applicable to every manufacturing business, that costs per unit are likewise reduced by production on a large scale. (Tr., 249.) The same rule should be applied where the increased consumption is brought about by an increase of capital assets in the form of gas appliances instead of or in addition to money spent for solicitors or advertising. The city's position would be correct if profit in the sale or rental of gas appliances were the object of the investment, but it seems plain that that is not the case. The question of the success or failure of the investment is immaterial. True, the state does not underwrite every public utility enterprise or every investment of capital by such an enterprise. If such investment be reckless or improvident, it must fail of a return. (Minnesota Rate Cases, 232 U. S. 454.) But it must be remembered that the state has not chosen to perform this public service, but has allowed it to be performed by a private corporation; that such a corporation must act by human agents, with judgment that is liable to human error. If, therefore, this private property has been adventured in the public service with reasonable prudence and foresight, as was the case here, it should be entitled, in the usual phrase, to a fair return on its fair present value. Here the investment in the appliances seems to have been immediately successful in its object to increase gas consumption, and the falling off of the number of gas arcs to have been due to a new electric lamp—a case of obsolescence of a rather striking character, against which provision is impossible. The city's claim to a deduction is denied.

1907 5. Duplication of Mains.—A more accurate title might be "multiplication of mains," since no objection is made to two mains in a street, but I follow the example of the parties in the selection of the descriptive words. The city makes no objection to the inclusion in the capital assets of mains 12 inches or over in diameter or to two mains under 12 inches, either alone or in addition to larger mains, but if there are three mains in a street all under 12 inches, the smallest is excluded as unnecessary. The amount involved, including pipe, paving over it and the additional overhead is \$193,356.09.

It is a fact that the capacity of the mains upon which the pressure depends, must always be beyond the peak demands, the witness Bryant estimating the proper excess at 100 per cent. This is to provide for feeding districts beyond any particular distributing area and also for growth. It is also a fact that as inadequacy of capacity approaches a gas company will ordinarily not take up the old mains but will lay another of equal or greater size. This is an economy so far as both company and consumer are concerned; it seems hardly fair for the consumer of one period to bear the costs of a distributing plant too far in excess of present requirements. In course of time it will result in a system not ideal, one that a gas engineer would not design if he were building anew for the period under examination. If this case presented an instance of multiplication of mains that came about normally in the growth of a single

company, it is my view that deduction such as the present would not be allowable. But the claimed abnormality that the city complains of seems to be entirely the result of a period of competition that prevailed in the early part of this century. Before the ultimate consolidation in the plaintiff company there were five companies competing for business, the San Francisco Gas and Electric, the Metropolitan, the Equitable, the Independent and the Pacific Gas Improvement companies. Each sought the districts of largest consumption with its mains, and rates were cut to cost or under. That meant, in essence, waste of capital, and could not continue indefinitely. True, as plaintiff contends, competition increased consumption and to that extent justified a certain amount of duplication of mains. But it would seem inevitable that a large amount of such duplication in mains would mean capital wasted forever, or until consumption would very greatly increase. If a purchase ensued, as it did, either of two things must have happened. Either the purchaser did not pay for the needlessly duplicated mains or, if he did, it was to save himself further loss and restore the integrity of his own damaged investment. The city now objects, and very properly, it seems to me, to having this property written back into the capital upon which it must pay a return, while at the same time losing the advantage of the lower rates which the competitive conditions brought about. What I have said assumes that there were more companies than were needed and greater capacity in the mains at points of competition than was needed. It is not demonstrated with mathematical certainty that there is an excess capacity in the mains, but it would naturally result from the conditions described and seems to me sufficiently proven by the evidence. There is opposed to this conclusion the judgment of Mr. Jones, and that is strong evidence, for there is no doubt of his ability or of the sincerity of his opinion. He says he has deducted the mains which he thought unnecessary for proper service; on the other hand, he says he cannot be certain that all are necessary that he has included. Mr. Jones is an operating man whose natural inclination would be to have ample capacity in his plant. It seems to me Mr. Ellis has, on the whole, made his eliminations fairly and judiciously, and his contentions have been supported by the Company's course in removing or abandoning mains in years subsequent to 1914. The deduction will be made, namely, from the value found for 1913-14, \$193,356.09; for 1914-15, the same, less \$18,184.40 (Exhibit 12, p. 2), or \$175,172.69; and for 1915-16, the 1914-15 results will be carried forward without change.

6. Pavement After Laying of Mains.—In the agreed inventory, as in the usual inventory made by engineers of underground distribution pipes, there is included, separately, an item of pavement over the mains. (Exhibit 3, p. 285 et seq.) This refers to pavement existing at the date of the inventory, some of which, as a matter of history, was laid by the city and at its expense after the mains were in the ground. There is also included in the Jones inventory and appraisal, in the unit costs of the pipe under the head of "trench-

ing" and as a part of trenching costs, an item for cutting through the existing pavement. (Exhibit 3, p. 270.) The city contends that all such items of cutting or replacing pavement laid after the mains were actually laid should be deducted from the values already determined on the reproduction cost basis. The deductions claimed are as follows (Exhibit 10, Schedule 7):

1909 Pavement	\$234,781.14
Cutting pavement	34,667.78
Deductions for pavement not laid, estimated, information lacking	325,000
Total	\$594,448.92

In the reproduction cost figures heretofore in this report, the above items are included, together with additional overhead allowances not included in the figures just given, namely, 2 per cent administration and 3 per cent, compounded, interest on the cutting pavement item, and 3 per cent on the two other items. With this addition, the matters objected to are represented in my reproduction cost estimates by the figures \$612,931.61.

At the argument (Arg., pp. 380, 387), it was conceded by plaintiff's counsel that if, on principle, the city's claim for a deduction of pavement was to be sustained, the city's figures should be taken as correct.

I recall several decisions where such paving costs have been deducted, for the reason stated by the court that the company does not own the pavement. Of course this is a false quantity; no claim of this sort would ever be made, the separate itemization of pavement in an inventory being due solely to added convenience thus attained in estimating reproduction cost of the company's underlying pipe. A strict application of the reproduction cost method would include existing pavement. For whether we view this matter of valuation of capital as in effect a condemnation, or, on Professor Fairchild's basis, are trying to determine costs of service, we must take the position of the condemning municipality or the potential competitor; and to each of these the necessity of paying for the construction of this pavement over new mains that might be laid in competition with those of plaintiff would be a factor in considering what they would pay for plaintiff's plant. Furthermore, the existence of this pavement is, in some degree, a protection from moisture and so a factor that increases the value of the pipes by prolonging their lives. On the other hand, the city contends that the increased expense of repairs caused by the modern pavement reduces net earnings and therefore the value of the property. Furthermore, it is pointed out that the hypothetical competitor-buyer would build a cheaper and more efficient substitute plant; and since the city is endeavoring to do justice by valuing the identical plant as it has grown up historically, rather than a cheaper substitute plant, not in fact built, the company should likewise recognize the

facts of history which disclose that these pavements represent no actual investment of money by the plaintiff.

This very point came up in *Des Moines Gas Co. vs. Des Moines*, 238 U. S. 171, where the court said:

"As to the item of \$140,000 which, it is contended, should be added to the valuation, because of the fact that the master valued the property on the basis of cost of reproduction new, less depreciation, and it would be necessary in such reproduction to take up and replace pavements on streets which were unpaved when the gas mains were laid, in order to replace the mains, we are of opinion that the court below correctly disposed of this question. These pavements were already in place. It may be conceded that they would require removal at the time when it became necessary to reproduce the plant in this respect. The master reached the conclusion that the life of the mains would not be enhanced by the necessity of removing the pavements, and that the company had no right of property in the pavements thus dealt with, and that there was neither justice nor equity in requiring the people who had been at the expense of paving the streets to pay an additional sum for gas because the plant, when put in, would have to be at the expense of taking up and replacing the pavements in building the same. He held that such added value was wholly theoretical, when no benefit was derived therefrom. We find no error in this disposition of the question."

So far as the master places his decision on the ground that the company did not own the pavement, and on the further ground that the life, and therefore the present value, of the mains was not enhanced by the protecting pavement, there is plain error that needs no argument to demonstrate; and it is against reason to suppose that the Supreme Court approved the exclusion for these reasons. Rather must we assume that the approval rested upon the general grounds of equity stated. The court below (*Des Moines Gas Co. vs. Des Moines*, 199 Fed. 208) did not fall into the error of the master as to the influence of the paving in prolonging the lives of the mains, for he says, "Finally, pipes under a paved street are of very long life, many times longer than if the streets were not paved."

1911 It is true that in the *Consolidated Gas Case*, 157 Fed. 854,

Judge Hough allowed not only present value of land, but of pipes under "continuous sheets of asphalt over granite;" and the Supreme Court affirmed the principle of valuation thus adopted in general terms, 212 U. S. 52. But the briefs in the *Des Moines* case before the Supreme Court show that this argument was urged by the appellant.

I find here that the present asphalt pavement is a benefit to the pipes and increases their present value by increasing their remaining lives. But it is also true that it increases the expense of repairs which are borne by the rate-payers, how much the record does not enable me to state. I do not pursue this line of thought further. For, viewing the *Des Moines* decision, as I do, as embodying a rule for disallowance of pavement subsequently laid over mains on general grounds of equity, it seems to me further discussion is

without profit. The deduction of \$612,931.61 will be made from the values for each of the three years. If the facts of this case warrant a different disposition of the matter from that in the Des Moines case, the decision should come from the Supreme Court.

This rule may prove troublesome in connection with the calculation of depreciation reserves. For the replacement requirements will include paving, but under ordinary methods the annual allowance to amortize depreciation is calculated upon present value as determined, omitting paving. Obviously that could be taken care of either by carrying the paving costs upon replacement into capital account or by calculating the depreciation allowance on the reproduction cost of pipe and paving. I mention the matter in passing; if deemed material it will be discussed in connection with the subject of depreciation.

I may mention another difficulty in the application of the Des Moines case principle. I refer to its application to cases of purchase. I have said elsewhere, and it seems to me irrefutable, that the term value means the same in all connections; that value in exchange and value in rate-fixing inquiries are the same thing. If a purchaser were considering what he would pay for this plant, he would estimate the cost of an alternative competitive installation. In that estimate he would take account of present conditions not represented by this company's experience in the past; of present congestion and difficulties in down-town business districts due to subsequently installed pipes and underground structures of others, all of which would increase the cost of his pipe-laying. He also would have to cut and lay this paving and would include consideration of its cost in fixing the offer he would make for the present plant. And suppose a condemnation by the city were to take place. The city would be bound to pay market value of the mains, and that certainly would not be less to the city than to a private purchaser. Suppose a purchase had taken place in June, 1915, in which, following this reasoning, the existing paving was recognized in the purchase price. In justice, it would have to be allowed returns in the rates for 1915-16. But the paving would not be recognized in the capital for 1914-15. We thus have the inconsistent result of a necessary raise in rates due to a transfer of ownership. The only way in which this logical result could be avoided would be by the refusal of state authorities to approve a purchase on this basis. It is well to recognize that in so doing the state would be interfering with the ordinary economic principles that govern human actions in business matters.

7. Past Charges for Service Connections.—There is contained in the agreed Jones inventory and appraisal a sum representing the reproduction cost of 78,939 live services, including 10 per cent engineering overhead, viz., \$2,344,853.15. In the foregoing reproduction cost figures for the three years, called, for brevity, value, this sum is represented with the addition of 2 per cent for administration, etc., and 3 per cent interest during construction. The city claims that the Jones appraisal should be diminished as follows: Amount paid by consumers on service connections, 1906-12, \$120,-

796.91; estimated amount paid by consumers prior to 1906 on services still existing, \$100,000, a total of \$220,796.91. This amount, with additional overhead, is represented in my reproduction cost figures for the three years by the amount \$231,555.72, the sum to be deducted each year if the city is correct in its position.

If the point were well taken in point of law, I would not feel justified, upon the evidence, in deducting more than the first item of \$120,796.91, plus additional overhead, or a total of \$126,683.00.

The services referred to in the inventory extend from the main in the street to the consumer's meter within the property line, an average length of fifty feet. (Exhibit 3, p. 280.) The average reproduction cost of all services is \$25.6004 each (\$26.85 with additional overhead). Some services cost \$125, some \$18. (Tr., 567,568.) In years past the cost has been higher than the latter figure. (Tr., 921.) It was the company's practice, prior to 1912, to exact a payment of \$10 for each new service connection made, although this payment was often waived in the face of actual or potential competition. In 1912, this practice was discontinued pursuant to an order of the State Railroad Commission, and I understand that the company now lays service pipes to the meter without cost to the consumer. The evidence upon the whole subject is not as clear as I could wish. I am not sure why the company made the service charge. It was not a deposit on account of future bills for consumption, but a final payment to the company's account. It may have been in the nature of a fee for beginning service. If so, though the point is not decided in the absence of issue made or argument heard, it would appear to have been a charge without warrant of law. The company might conceivably have adopted a regulation that the property-owner should provide the cost of his own service pipe from the meter to the property line, to be there joined to the company's service to the main, the installation to be made by the company. If so, the pipe from property line to meter would belong to the owner of the land. Furthermore, such a practice would not result in a uniform charge, since the length of pipe and costs of installation would vary. We may conclude that the \$10.00 payment was a fee; and that the services in question from the main to the meter are the sole property of the gas company. This fact of ownership is conceded by the city, and apparently the logic of the situation justifies the concession. (Arg., 392.) But if the company owns these services, it is difficult to see why it should not earn a return upon them.

The city's argument is that the capital value of the services should be decreased in analogy to the Supreme Court's treatment of subsequent paving over mains. But the analogy does not hold. In determining present value by the method of reproduction cost, the Supreme Court held that it would be unjust to take into account an added factor of cost that would not in fact become real until actual replacement of the mains. As regards the services, there is no added factor. What the company, in effect, said to the new customer prior to 1912 (or to the majority of them) was, "I will serve you gas if you will pay me rates such as will return me a reasonable return on the value of my property employed in the public service; and in addi-

tion will pay me forthwith an initiation fee of \$10.00." If the fee was lawfully exacted, then there must have been a present quid pro quo; there remained the duty to pay a return on the value of the company's property. The new consumer acquired no part ownership in that property. If, on the other hand, the fee is to be regarded as having been unlawfully exacted, the duty to pay rates was not thereby diminished. The consumer's remedy was to compel the connection by mandamus, or, having paid the fee under protest, to sue for its recovery.

The deduction for services is denied.

Summary of Deductions from Capital.—Summarizing the exclusions from the capital value of the structures, as determined by reproduction cost new, we have:

	1913-14.	1914-15.	1915-16.
Duplication of mains...	\$193,356.09	\$175,172.69	\$175,172.69
Paving over mains.....	612,931.61	612,931.61	612,931.61
Total of exclusions.	\$806,287.70	\$788,104.30	\$788,104.30

Adjusted Reproduction Cost New Structures.

We have now to apply these deductions to the figures heretofore determined as the average value of structures for the three years. (Ante, pp. 18-19:)

	1913-14.	1914-15.	1915-16.
Total structures.	\$13,600,296.01	\$13,853,470.50	\$13,965,192.00
Less deductions.	806,287.70	788,104.30	788,104.30
Net value, new	\$12,794,008.31	\$13,065,366.20	\$13,177,087.70

It is next to be determined what amount, if any, is to be written off the capital values thus determined, by reason of accrued depreciation in structural values, and coincident therewith, the amounts to be allowed in annual costs to provide for any such loss.

Depreciation.

As a preliminary to the discussion of this subject the positions of the parties can be briefly indicated, a more detailed statement being reserved until the evidence is considered. The company contends that its plant capital, as a basis of earnings, should suffer no deduction because of supposed depreciation due to age, but only, if at all, by the amount of "deferred maintenance." And where, as here, there have been abandonments of large units due to obsolescence, the loss should be reimbursed by amortization over a period of years after, rather than before, the replacement, this amortization being effected by dividing the economies resulting

from new machines and processes between owner and consumer, thus allowing a partial reduction in the rate.

The city, on the other hand, proceeds on what will be hereafter described as the modified sinking fund method, involving an estimate of the lives of the different structural units, and an annual allowance set aside from the rates received as a reserve for future replacement on a 5 per cent compound interest curve, the capital basis of return to the owner being depreciated each year in an amount exactly corresponding with yearly additions to the reserve. It is assumed that loss of plant units by obsolescence and inadequacy, as well as by physical decay, can be forecast with substantial accuracy and provided for in advance of abandonment and replacement.

As a further preliminary, it seems necessary to refer to certain prior cases in this court. Perhaps because of the former requirement of the Constitution of California that the rates of charge of public service corporations should be fixed annually, this district has had an unusual number of suits like those at bar, and this fact, incidentally, has been the principal reason for the existence here of a standing, or permanent, master. It has also happened, if I may judge from the reports and from correspondence from all over the country, that it has fallen to this court, more than to others, to give exhaustive examination to the question of depreciation. This is because it has been completely presented by the engineering witnesses. I will refer to two principal cases prior to the present.

In *Contra Costa Water Co. vs. City of Oakland*, two suits concerning the validity of water rates for the years 1903-4 and 1904-5, a master's report was filed in October, 1916, and since has been confirmed. It is not in print. It was shown that the company's practice had been to charge off depreciated capital only at the time of abandonment and to the operating expense of that year. It had no reserve for depreciation. This was current accounting practice; it is the replacement method described below. Indeed, the creation of a reserve by annual allowances from the revenues had been disapproved by the Supreme Court of California. *Redlands Water Co. vs. Redlands* (1898), 121 Cal. 312; *San Diego Water Co. vs. San Diego* (1897), 118 Cal. 556, Beatty, C. J., dissenting; and apparently 1916 by the Supreme Court of the United States. *U. S. vs. K. P. Ry. Co.*, 99 U. S. 455, 459; *U. P. R. R. Co. vs. U. S.*, 99 U. S. 402, 420-1 (semble); *San Diego L. & T. Co. vs. Jasper*, 189 U. S. 439, 446 (1903) (semble). The City Council of Oakland, the rate-fixing authority, valued the company's property as depreciated by age and use, and made no allowance to offset this wastage except to charge operating expense with the prior year's abandonments. When the suits came to hearing the *Knoxville* case had been decided, 212 U. S. 1 (1909). Both sides deemed this case to require the valuation of the existing structural capital as depreciated, though no reserve had been accumulated, and to require also the provision in the costs of service of an annual allowance to a depreciation reserve for the future. There was an unusually able aggregation of engineer wit-

nesses on both sides. The four methods of accounting for depreciation hereafter set forth were there first presented to a court. The company's witnesses adopted what I have called the modified sinking fund method,* and in addition testified that as a fact, apart from the theoretical requirements of the accounting method, the past and future course of depreciation in fact, and therefore the present condition, could be determined by the application of a 5 per cent sinking fund curve to the various units according to their ages and estimated lives. The city's engineers followed the straight line method. Partly because of the direct testimony as to present condition in fact, largely also because the straight line method involved a much greater deduction than the other method from the capital entitled to a return on the score of so-called depreciation identified with a presumed but fictitious payment to reserves in the past, and because I considered the straight line method undesirable in other respects, the master's findings followed the method and results of the company's engineers.

Among these engineers were the late Arthur L. Adams of Oakland, California, Frederic P. Stearns of Boston, and others, who sat as a board to determine methods of amortization of depreciation and the proper application of this consideration to the case before them.

Mr. Stearns was later chairman of a committee on valuation of public utilities of the American Society of Civil Engineers, which, on December 1, 1913, made a report in which the four methods of accounting depreciation were set forth, and the modified sinking fund, or "equal annual payment" method was approved. The report met much opposition and was referred back to the committee for further consideration. A final report was made in 1917 October, 1916, and presented in January, 1917. I do not know whether it was adopted. It is, perhaps, not unfair to the report to summarize it by saying that it allowed greater weight to the replacement method than did the first report, and laid much stress on the necessity, in justice to both utility and the consumer, of taking into consideration the practice of the company prior to the time as to which rates are to be fixed.

The next case in this court to be referred to is Spring Valley Water Company vs. San Francisco (eight suits, consolidated). The report was made in 1917, and is in print, though not officially reported. The testimony was given and the discussion of depreciation written before the engineers' committee's final report was available. Leonard Metcalf, secretary of that committee, was one of the witnesses here; Allen Hazen of New York was another. The city's witnesses used the straight line method of figuring depreciation, as in the Contra Costa case. The company's engineers likewise depreciated the structural property. Mr. Metcalf obtained present value and the annual increment for the depreciation reserve by using a 4 per cent curve, giving effect to the results of inspection

*This is not accurate. The method followed was the slightly differing Adams method, described in the Supplemental Report, *infra*, p. 141.

in his estimates of future life. Mr. Hazen's method was substantially the same, though with greater emphasis on an initial determination of percentage condition as an effort of judgment from careful inspection and consideration of past history. In effect, however, this required an estimate of remaining life and the assumption that future replacement cost would equal that of the present, and from this data, using a 5 per cent interest rate, the problem of present reproduction cost less depreciation became the problem of determination of the present worth of the future replacement cost. Mr. Hazen gave the master a considerable shock by stating that the best engineering knowledge was not capable of predicting with assurance the total lives of many important water works elements, even as affected by physical decay, to say nothing of the factors of obsolescence and inadequacy. Just as both sides followed what was considered the doctrine of the Knoxville case in deducting estimated depreciation from reproduction cost to determine present value, so both sides, and the master as well, felt that that case required that no consideration be given to the company's actual practice in accumulating a reserve in the past since the year 1908. The replacement method was given only passing notice. In both the Contra Costa and the Spring Valley cases, then, the issue was between the results shown by the 1918 modified sinking fund and the straight line methods, with a decision in favor of the former.

When the Contra Costa report was written, I felt that the problems connected with depreciation had been solved, consistently both with the decisions of the court of last resort and with right reason, by the modified sinking fund method. This view also characterized the Spring Valley report, though somewhat shaken by doubt as to the possibility of estimating future lives, and with greater emphasis placed on the ascertainment of present condition in fact, irrespective of theoretical amortization in the past. In the present case, the city has abandoned the straight line method and conformed to the master's former preference as to method. But my renewed consideration of the problem in the light of the evidence here, together with a consideration of current literature on the subject,* leads me to the belief that the whole matter must be re-examined for a possible clearer statement. I have no hope that this report will be the last word on the subject, but I think a step forward can be taken. At the risk of repeating what I have said before, I propose to examine the whole subject *de novo*, irrespective of the decisions; and then consider what the decisions embody.

When we say that a reasonable rate or price is one that gives the manufacturer or utility owner a fair return on the fair present value of the property which is the instrument of production, we of course refer to a net return available for distribution or dividend to the

*The following, among others, have been of help: Report of the Special Committee on Valuation of the American Society of Civil Engineers, presented January 17, 1917; a criticism of the prior report of the above committee, by Louis L. G. Benedict of New York (pamphlet); a pamphlet entitled "In re Theoretical Depreciation," by James E. Allison of St. Louis.

owner after costs are paid and without withdrawing any portion of the capital. Among the costs are operating expenses, taxes and repairs. Repairs are replacements of parts that have worn out with use or have been broken by accident. If the normal operation of a machine requires only the renewal of certain bearings once a year, or other repairs constant in amount each year, obviously net earnings do not vary by reason of the repairs. And since value depends on net earnings, there is no depreciation; it is always the replacement cost new. So, if a meter could be kept operating efficiently by repairs of uniform cost, consisting of replacement of different parts, it would always be worth the same, since net earnings are not changed. There is no depreciation and no abandonment; it is the same meter, although in time no original part remains. Age and wear are thus not necessarily factors in depreciation of value.

But repairs may not be uniform each year in other machines or structures; they may increase until no net earnings are left, or become so great that it is cheaper to replace the structures with new ones. This is abandonment because of physical depreciation. Or the machine, though physically in good condition, may become obsolete through a new invention that will effect such economies in costs as will pay the loss by scrapping of the old machine and thereafter give greater net returns. Or the service demands may grow beyond the capacity of the machine or pipe so that it is cheaper to replace it by a larger unit than to duplicate the old unit, which is still in good physical condition. Thus replacement may come about through obsolescence or inadequacy; and the depreciation in value of the abandoned unit for either of these causes is sometimes called functional depreciation.

The difference between repairs and replacements is thus one of degree, not of kind; and the line will sometimes be hard to draw, as in the case of a pipe system. But, like repairs, provision for replacement of plant units through deterioration and abandonment is a cost of production or service which the charges to the public must provide, and which must be determined before the owner's profit can be estimated. It is the owner's duty to replace; it is the consumer's duty to reimburse the owner.

Now, provision for this replacement can be made concurrently with abandonment, just as in case of repairs; or if the amount involved is so large as to disturb the necessary substantial uniformity of rates of charge in successive years it may obviously be accumulated in installments, either before or after the abandonment.

Until this case it had not occurred to me that, so far as theory is concerned, reimbursement of the owner could take place after abandonment. It would not seem fair if it involved a raise of rates. Physical depreciation, for example, if an accumulation is necessary to provide for replacement, ought to be provided beforehand from the rates of users of the service which caused the machine to wear out. But where replacement is made on account of obsolescence or inadequacy, an economy is effected in costs, and that economy can

with fairness be devoted to reimbursement for the replacement cost, the rates remaining unchanged. I know of no well-considered method to meet this reimbursement after the fact. The installments

would have to include interest on the unpaid principal and 1920 capital would thus not be depreciated for purposes of return.

An estimate of the period of amortization would not have to be made if all economies of the new machine were devoted to the amortization; it would work itself out. If the economies were shared with the rate-payer, as plaintiff here suggests, the period should not extend beyond the estimated life of the new machine; a plan which is subject to the objection on the grounds of uncertainty common to all such estimates.

But if replacement is to be taken care of, either at the time of abandonment or by accumulation before hand, the four methods I have referred to are available. I now repeat these from former reports. Because of this fact of repetition I would place them in an appendix if it were not that they are as important to any discussion of depreciation as the alphabet or the multiplication table to language or arithmetic. Much current misapprehension and many pages of discussion would have been avoided, I am sure, if these simple tables were comprehended; and I think the reader who is not an engineer would do well to assure his understanding by constructing tables of his own on different premises.

To make a table illustrating depreciation and other costs at all, it is necessary to make certain assumptions that do not accord with experience. We assume that the plant that renders service consists of one unit or a group of units having the same life in service; the fact is that any public service or manufacturing plant contains many, often thousands, of units or groups of varying life-periods. We assume that original cost and replacement cost at all times are the same. We assume the life of the unit can be forecast with substantial accuracy.

Let us, then, assume that the owner invests in a plant for serving the public \$100,000, replacement cost being the same; that the life of the plant is ten years; that a fair rate of return during this period is 6 per cent, and that any sinking fund that may be established will earn 6 per cent. No significance whatever is to be attached to my choice of this rate of interest. In the tables that follow salvage values of replaced units are neglected.

Now, it is evident that, on these facts, the owner will be entitled to distribute to himself in dividends the sum of \$6,000 each year. He will also be entitled to earn enough so that at the end of ten years he will have in hand \$100,000 for replacement. The 1921 earnings will also provide \$x for operating expenses, taxes, repairs; this sum being constant, irrespective of the method of accounting depreciation, is omitted from the tables that follow. The sum of these three, dividends, replacement allowance and expenses, are the total costs of production, the reasonable gross earnings.

In estimating the merits of the different methods two principles should be borne in mind:

1. The principle of interest. In any accounting of costs, money should be earning interest in the hands of its possessor, and the theory should take account of this. To the extent that the plant owner is charged with idle money, his investment is confiscated to that extent.

2. The principle of equal annual payments for service. For obvious economic reasons, gas or other commodity should fluctuate in price as little as possible, and, the practical reason, it is difficult to change public utility rates except downward. There will arise certain factors that may require the raising of rates, of necessity, e. g., increased operating expenses due to increased cost of labor or materials, or increased taxes. But fluctuation in rates ought not to take place on account of the selected method of amortizing depreciation.

In the following tables one column is called Rating Base; the next Depreciation Allowance, meaning the yearly contribution from earnings, toward the replacement fund; the next, Owner's Return, being 6 per cent interest on the amount shown in the first column for that year; and the last column, Total Ratepayer's Payments, which is the sum of columns three and four, and with x dollars operating expenses, etc., represents gross earnings. I use the term Rating Base for lack of a better one; it is the base on which the interest rate of 6 per cent for owner's return is calculated. It has been called value, residual value, capital, and the like. The column entitled Owner's Return likewise does not always show all his return. In the comment on the methods I have avoided discussion from the accountant's point of view, for the reason that I wish to avoid error due to my lack of full understanding of accounting theory and terminology.

By the first or replacement method of accounting for depreciation and replacement the abandoned unit is paid for at the time of
 1922 abandonment out of earnings received in the year of replacement, thus:

Table I.—First or Replacement Method.

(1) Year.	(2) Rating base.	(3) Depreciation allow- ance.	(4) Owner's return.	(5) Total ratepay'rs' payment (3+4).
1.....	\$100,000	0	\$6,000	\$6,000
2.....	100,000	0	6,000	6,000
3.....	100,000	0	6,000	6,000
4.....	100,000	0	6,000	6,000
5.....	100,000	0	6,000	6,000
6.....	100,000	0	6,000	6,000
7.....	100,000	0	6,000	6,000
8.....	100,000	0	6,000	6,000
9.....	100,000	0	6,000	6,000
10.....	100,000) 0)	\$100,000	6,000	106,000
		<hr/>	<hr/>	<hr/>
		\$100,000	\$60,000	\$160,000
11.....	100,000	0	6,000	6,000

In the eleventh and succeeding years, the cycle continues as in the table. The method does complete justice, if carried out, between owner and consumer. The consumer gets his service at the assumed reasonable cost; the owner gets his agreed dividend each year and the necessary fund to restore his capital wasted in the service. Obviously the valuation of the property upon which the percentage, assumed to be fair, is calculated must not be decreased on account of progressing loss of service life, even if depreciation in value is becoming evident in increased expense for repairs. To decrease dividends on this account is pro tanto confiscation. The replacement method is complete and just where practicable. Therefore, the Knoxville decision, to the effect that the present value of a plant as the rating base for returns must show a deduction for depreciation, cannot express a principle of valuation, a universal rule everywhere applicable, and was not so intended; that it is true in the usual case will appear. Furthermore, the Knoxville decision may lead to injustice where it is applied midway the life of a unit, where the accounting for replacement, either by public regulation or 1923 other justified course of practice, has been on the replacement method, and no reserves created.

The outstanding merit of the replacement method is that it does not involve any estimate of the life of a structure in service. If the unit in the table in fact lasted seven years, or fifteen years, instead of the assumed ten, no adjustment would be required; the earnings of the year of abandonment would provide reimbursement for the loss of capital occasioned by abandonment. The importance of this point will appear when I discuss the reliability of estimates of the life of structures. The objections to the replacement method are given illustration in the above table itself. It obviously offends

against the rule that the total earnings and the resulting rates of charge for service must approximate equality each year. It is here theoretically just, but practically impossible. The table shows a one-unit plant charging the public \$6,000 plus x dollars each year for nine years and then \$106,000 plus x dollars in every tenth year for the identical service. It is idle for defenders of a 100 per cent valuation theory to justify it on the ground that the public obligation to reimburse the owner for loss of capital by abandonment is an asset that maintains the capital at 100 per cent; in the case shown in the table reimbursement simply would not take place—it could not be effected.

But it is contended by partisans of the replacement theory that the facts will often show possibilities of application that the exigencies of table making have concealed in the example given. Suppose a ten-unit plant, each unit of \$100,000 cost and ten years' life, installed in each successive year after the first. The gross earnings will show increases with the growth of capital but no increment for replacement until the cycle of replacements begins with the tenth year. In each year after the ninth there will be added to total charges the sum of \$100,000 for current replacement; the entire plant will be rated at, and will have a value of \$1,000,000 at all times; there will be no reserve; the dividends will be \$60,000 each year; and the total ratepayers' payments \$160,000 plus x dollars.

A table to show this condition may be illustrated thus:

1924 *Table Ia.—Replacement Method—Ten-unit Plant.*

(1)	(2)	(3)	(4)	(5)
Year.	Rating base.	Depreciation allowance.	Owner's return.	Total ratepayers' payment (3+4).
1.....	\$100,000	0	\$6,000	\$6,000
2.....	200,000	0	12,000	12,000
3.....	300,000	0	18,000	18,000
4.....	400,000	0	24,000	24,000
5.....	500,000	0	30,000	30,000
6.....	600,000	0	36,000	36,000
7.....	700,000	0	42,000	42,000
8.....	800,000	0	48,000	48,000
9.....	900,000	0	54,000	54,000
10.....	1,000,000}	\$100,000	60,000	160,000
	900,000}			
11.....	1,000,000}	100,000	60,000	160,000
	900,000}			

Assuming the plant to be stabilized at ten units after the tenth year, there will be obviously no disturbance of rates to provide for replacement. But it is equally obvious that in the tenth year (and in any year thereafter when a first replacement of capital added after that year takes place) there will be just as radical and objectionable an addition to the total costs as was illustrated in the one-unit plant

of Table I. It should be noted that, under the replacement method, each addition to the plant is paid for out of new capital supplied by the owner, since there is no reserve.

I have said that the value of the plant maintained by the replacement method is the replacement cost new, at all times. That value for rate-fixing purposes and value for purchase or condemnation, are identical when all the elements of the productive plant are included, seems to me obvious. Value to a purchaser of the ten-unit plant would be \$1,000,000 at all times after replacements became uniform, irrespective of decay of individual units, because the net earnings, after all provision necessary for replacement and operation, are always \$50,000. What would the purchaser pay for the \$100,000 plant illustrated in Table I? I cannot say, and do not stop to figure. For no one would buy a plant for the purpose of earning dividends each year of \$6,000 when faced with the necessity of himself providing \$100,000 for replacement in the tenth year.

1925 Now, in any case such as that illustrated in Table I, where replacements are not fairly uniform, the obvious remedy would be to spread the loss by abandonment over a period of years. A natural method that would occur to the owner would be to create a reserve in advance of abandonment; and the most natural reserve would be one that would be in active employment and therefore take account of interest. In other words, he would create a sinking fund: estimate the life of the fund (which would naturally expire with the life of the plant unit concerned), and add to his costs of service the amount of that annuity which, in the given life at the given rate (here 6 per cent), would accumulate the amount desired, here \$100,000. The reserve could begin at any time; the only effect of beginning later would be to increase the annuity. Assuming that the accumulation of a reserve for replacement begins in the first year, the sinking fund method is shown thus:

Table II.—Second or Sinking Fund Method.

(1) Year.	(2) Rating base.	(3) Payment to sinking fund.	(4) Earnings of sinking fund.	(5) Owner's return.	(6) Total ratepay's payment (3+5)
1.....	\$100,000	\$7,587	(.....)	\$6,000	\$13,587
2.....	100,000	7,587	(\$455)	6,000	13,587
3.....	100,000	7,587	(938)	6,000	13,587
4.....	100,000	7,587	(1,449)	6,000	13,587
5.....	100,000	7,587	(1,991)	6,000	13,587
6.....	100,000	7,587	(2,566)	6,000	13,587
7.....	100,000	7,587	(3,175)	6,000	13,587
8.....	100,000	7,587	(3,821)	6,000	13,587
9.....	100,000	7,587	(4,505)	6,000	13,587
10.....	100,000 } 0 }	7,587	(5,230)	6,000	13,587
		<hr/> \$75,870 + (\$24,130) <hr/>		<hr/> \$60,000	<hr/> \$135,587
100,000		\$100,000			

The amount in column three, \$7,587 (approximate), is found from sinking fund tables as the annual payment to a fund which, with compound interest at 6 per cent, will, in ten years, amount to \$100,000. The earnings of the fund are shown in the parenthetical column four; thus \$455 is 6 per cent interest on \$7,587; \$938 is

6 per cent interest on twice \$7,587 plus \$455, and so on; the 1926 ten payments, amounting to \$75,870, and the total interest, \$24,130, aggregate \$100,000. The yearly dividend for the owner of \$6,000, which, by hypothesis, is his fair return, is clearly shown. Total charges for service, \$13,587 plus x dollars (operating, etc.), are uniform each year. Provision being apparent in gross earnings for replacement, the unit is at all times worth \$100,000, the capitalized value of the net earnings.

The merits of this method are thus evident. It has two defects that deserve mention. One is the complexity of computations required. For, in actual fact, a utility plant consists not of one but often of thousands of groups of units having the same age and remaining life and the sinking fund annuity must be determined for each. In practice, a weighted average is determined and kept in effect for a period, say five years, without change. Another defect, characteristic also of the two following methods to be described, is that estimates of the life of structures are not reliable. Each new case of this character that I have tried has increased my doubt as to the ability of engineers to forecast the lives of structural elements. As regards certain standard structures of moderate life, like boilers, experience may have shown that with proper maintenance and repairs a fairly definite period of usefulness may be forecast. But no one can say how long cast-iron pipe will last. No one can foretell the life of the steel pipe in this system, which has been elaborately protected in a covering of burlap and asphaltum, in the manner described by Mr. Jones. (Tr. 1159.) The advance of the technical arts that produces obsolescence or the fluctuations of population in particular areas that produce inadequacy cannot be foreseen except for a few years before supersession of equipment. And, for the latter reasons principally, it seems to me that, unlike tables of human mortality, tables of the mortality of structural elements, founded on the experience of plants all over the country, or a table of abandonments in the plant under examination, will, all alike, be unsafe guides for prediction of future experience. For certainly to the extent that past abandonments have occurred by reason of obsolescence or inadequacy, there can be seen no uniform rule, in the nature of things, and therefore no guide for forecast of the future. So, also, accounting practice may differ in different periods as to the distinction between repairs and replacements. The accountant of one period may draw the line as regards pipe, for example, at one length; the accountant of another period at a block.

To earn interest the yearly installments paid to the sinking 1927 fund must, of course, be invested in productive property.

The fourth column in Table II is enclosed in parentheses to indicate graphically that this earned interest does not come from the earnings of the plant unit with which the table is concerned, but

from another productive source. That source, the capital of the sinking fund, may, of course, be securities held intact until needed. A fund invested in safe securities will ordinarily not earn the same interest as the capital in the plant; instead of the 6 per cent in the illustration it may earn 4 per cent. But this would simply mean that the yearly payment to reserve would be \$8,329 instead of \$7,587, and the total ratepayers' payments for service \$14,329 (plus x dollars) instead of \$13,587 (plus x). It is a matter of indifference to the owner, since he gets his \$6,000 reward for the investment, and also has assurance of replacement. Any deficiency in the calculated earnings of the sinking fund would have to be added to next year's costs; any excess credited. There is one advantage in thus keeping the sinking fund in separate securities, even though it may result in added cost of service—the amount available can always be identified and is ready for immediate use.

On the other hand, it is often recommended and is common practice to invest the sinking fund in additions to plant, at once avoiding finding new money and reducing costs by reason of the greater rate of interest to be earned thus over the earnings of sound securities. Thus in the plant illustrated, to item A, the one shown in the table, there will have been added, from the sinking fund, items B and C, not here shown. When item A is abandoned there are no assets available for its replacement; the sinking fund assets have been used and the owner's obligation to replace them substituted; so that that obligation must now be fulfilled and the owner go down in his pockets for new money. Prior to this addition of new capital it is evident that despite the fact that units B and C have increased output and added to gross returns, the permissible dividend is still \$6,000 and the value of all the assets \$100,000, no more nor less.

As a plant becomes complex it, of course, becomes difficult to distinguish between assets like item A, built from plant capital, and items B and C, built from reserve funds. Proper accounting will show a sufficient reserve among the liabilities, but if the accounting is not honest or exact there is danger that the property account will be over-stated.

Now, what will a buyer give for this plant, say at the end 1928 of the fifth year? If the owner is a corporation and the purchaser is buying the capital stock, and the company's practice has been to invest the sinking fund in securities, he will appraise the physical property and examine the sinking fund securities to determine whether it is a sufficient reserve. If his estimate of future life remaining and of present replacement cost accords with Table II, earnings being fixed as there shown, he will give \$100,000 for the capital stock, despite existing depreciation in the plant. Or, instead of the stock purchase, he can buy the physical property for \$57,233, leaving \$42,767 of securities in the sinking fund with the former owner—a total to the seller of \$100,000. The new buyer, if he is wise, will restore the fund by devoting securities of his own, with their interest assumed at 6 per cent, to the same purpose. He will still draw out \$6,000 a year dividends. Or the regulatory body may

require him either by reduction of dividends or by payments of his own funds each year to restore the missing \$42,767 and interest in the residual life of five years. Or, in the absence of this requirement, he may declare the usual dividend of \$6,000 and make up the balance not found in the sinking fund, when replacement is needed, by his own funds. The point is that despite the fact that he may have paid out only \$57,233 for the physical plant, there is no ground for reduction of earnings by regulatory authority below the annual sum of \$13,587, shown in the table.

Suppose the sinking fund has been invested in plant, as above, in the fifth year, so that reserves are intact and new on the date of purchase. The purchaser will obviously not pay the replacement cost new of item A, \$100,000, plus the cost new of items B and C, \$42,767. He will pay the seller for the three items \$100,000, the replacement cost of A, and will thereafter pay himself dividends on A at \$6,000 per year. Or you can say, he has paid himself the \$6,000 on all the plant, A, B and C, by figuring 6 per cent on the replacement cost of A, less the required reserve, i. e., \$100,000 less \$42,767 or \$57,233, which is \$3,434, plus 6 per cent on the cost of B and C, \$42,767, which is \$2,566. Earnings are here thus based on replacement cost new less reserves, or residual value of all the physical items in the plant, including residual value of items built from reserves. In effect, this casts upon the seller responsibility for the sufficiency of the reserve. If he has not accumulated one, or has disbursed it in dividends that are not warranted, he will receive less by the amount of the missing reserve. If his reserves are insufficient the purchaser must make the deficiency good.

1929 Any intending purchaser will probably determine the amount of his offer about as follows: He will make an inventory of every item in the plant, estimate its replacement cost new and the age and the probable time of replacement of each. The gross earnings existing are known, and expected earnings may be estimated, from which, by deducting operating expense, the amount available for dividends and for depreciation reserves will be determined; and from this the method enables us to find the residual or purchase value at a particular time. Or, viewed as a valuation proceeding, the age, remaining life, and replacement cost enable us to determine residual value and the required payments to depreciation reserve, and from this we can determine the balance available for dividends and the consequent fairness of the rates of charge.

We thus get the suggestion of another method whereby we may determine either purchase or rating values of a plant consisting of depreciating units, omitting reserves unless invested in some of those units (and, in the latter case, omitting their reserves if invested outside the plant). Taking the one-unit plant as before, the table will be as follows:

Table III.—Modified Sinking Fund, or Compound Interest Method.

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Annual total of sinking fund.	Earnings, sinking fund.	Owner's return.	Total ratepay'rs' payment (3+5).
1.....	\$100,000	\$7,587	(.....)	\$6,000	\$13,587
2.....	92,413	8,042	(\$455)	5,545	13,587
3.....	84,371	8,524	(938)	5,063	13,587
4.....	75,847	9,036	(1,449)	4,551	13,587
5.....	66,811	9,578	(1,991)	4,009	13,587
6.....	57,233	10,153	(2,556)	3,434	13,587
7.....	47,080	10,762	(3,175)	2,825	13,587
8.....	36,318	11,408	(3,821)	2,179	13,587
9.....	24,910	12,092	(4,505)	1,495	13,587
10.....	12,818 } 0 }	12,818	(5,230)	769	13,587
		<hr/>	<hr/>	<hr/>	<hr/>
11.....	100,000	\$100,000 7,587	(\$24,130) (.....)	\$35,870 6,000	\$135,870 13,587

This table is the arithmetical equivalent of Table II.* Column six, totals of yearly costs (except operating, etc.), is the same 1930 in each table. Column three here is the sum of columns three and four in Table II, the total sinking fund at the end of any year. Column two is the value of the plant unit at the beginning of any year, i. e., its replacement cost less the reserves, accumulated to the end of the previous year, and column five is the interest on that residual value. Thus if reserves (column three) have been invested in additional plant, the total plant value is \$190,000, being the sum of the value shown in column two for any year, plus the total of each year's reserves prior to that, as shown in column three; and the divisible earnings, \$6,000, are the sum of columns four and five for the year in question.

For comparison, assume the ten-unit plant discussed when considering the replacement method (Table Ia); that is, a plant of ten units of equal cost, \$100,000, ten-year lives, added annually. Assume that here a reserve is accumulated. Then, under the modified sinking fund method, the table would be as follows:

* But see foot-note, p. 52, below.

Table IIIa.—Modified Sinking Fund Method—Ten unit Plant.

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Payments to reserves.	Earnings of reserve.	Owner's return.	Total ratepayers' payment (3+5).
1.....	\$100,000	\$7,587	(.....)	\$6,000	\$13,587
2.....	192,413	15,629	(\$455)	11,545	27,174
3.....	276,784	24,153	(1,390)	16,607	40,760
4.....	352,631	33,189	(2,842)	21,158	54,347
5.....	419,442	42,767	(4,833)	25,167	67,934
6.....	476,675	52,920	(7,399)	28,601	81,521
7.....	523,755	63,682	(10,574)	31,426	95,108
8.....	560,073	75,090	(14,395)	33,605	108,695
9.....	584,983	87,182	(18,901)	35,099	122,281
10.....	597,801 } 497,801 }	100,000	(24,132)	35,868	135,868
Sums.....	.....	\$502,199	(\$84,924)	\$245,076	\$747,275
11.....	597,801	100,000	(24,132)	35,868	135,868

These figures are not exact, by reason of the fact that the sinking fund annuities are approximations, without decimals. Whether the underlying mathematical law would bring round figures in the tenth year I do not know; though it seems possible.

1931 On the figures shown, it appears that at the beginning of the tenth year, after the owner has put into plant units a total of \$1,000,000 of his capital in ten equal installments, he has a residual value of those units (cost, less reserves for replacement) of \$597,801; and at the end of the tenth year, by reason of the complete depreciation and abandonment of the unit built first, the value has decreased to \$497,801. But, on the other hand, the reserves set aside from earnings in a fund that itself earns, show assets of \$402,199 at the end of the ninth and the beginning of the tenth year, with accretions during the year of \$100,000 from the earnings, so that the assets in the reserve fund at the end of the tenth year are \$502,199. The replacement taking place then reduces the reserve to \$402,199 and increases the plant value to \$597,801 again, which is the situation at the beginning of the eleventh and of each succeeding year, while the plant is stabilized on the ten-unit basis of the hypothesis. Dividends are paid of \$60,000; \$35,868 from earnings of the plant and \$24,132 from earnings of the sinking fund assets. On the \$1,000,000 of investment, plant residual values thus fluctuate between 59.78 per cent and 49.78 per cent of the entire assets—the investment, and this though the plant is kept in the best condition practicable and delivering perfect, 100 per cent, service; and the reserves in like manner fluctuate between 40.22 per cent and 50.22 per cent, the entire investment thus being at all times intact at 100 per cent.

Since, on the given hypothesis, there are only ten units in the plant, the cost of which has been provided by the owner's contributions of capital, it follows that the sinking fund will appear invested

in securities or otherwise outside the plant. It has been argued that it is absurd to maintain a fund in securities of between 40 per cent and 50 per cent of the plant value, solely to provide a yearly replacement of \$100,000. The owner cannot, however, complain, since he gets his full 6 per cent, \$60,000, on his investment. But, if the maintenance of the fund in securities would seem to involve increased costs of service for larger annuities because securities will not earn the hypothetized rate that the plant earns, and consequently an economic waste, we may vary our hypothesis and assume that after the tenth year at least four other units costing \$400,000 can be built from the sinking fund. The fourteen-unit plant is still worth \$1,000,000, no more, no less; and the reasonable return to the owner is \$60,000 in dividends each year. The returns from 1932 the added units are earnings of the fund, necessarily held for yearly replacement, not for distribution. Or, holding to the original assumption of a ten-unit plant, perhaps \$400,000 could have been taken from the reserve fund at intervals during the first ten years of construction. The owner would then have contributed only \$600,000 of his capital, and would obviously be entitled to a net return of only \$36,000 a year; after the tenth year the other \$24,000 would accumulate for replacements. The cost to the consumer would obviously be the same for the same plant, but if the plant were increased by four units by conversion of interest-bearing securities the gross returns would be increased \$24,000 per year, plus additional operating expenses, etc.

If it is correct to assume that a reserve against depreciation should be formed in advance of replacement, then it is apparent that those who advocate a 100 per cent replacement value as the just rating base for every item in the plant are overlooking the fact that some of those items may represent reserves, and that their earnings are not distributable as dividends. Another argument that is made is that such "theoretical depreciation" methods are covert attempts on the part of believers in state ownership of utilities to bring about gradual purchase of the plant through contributions to reserves. On the contrary, it has been shown that the reserves are the property of the owner, paid for, it is true, by consumers, but as part of the just costs of service; and payment of such costs of service to restore capital no more founds of a legitimate argument for ownership of capital than does the payment, through the rates, of operating expenses warrant the consumer in declaring himself the employer of the company's laborers.

Compare Table Ia, showing the replacement method applied to the ten-unit plant (*supra*, p. 43), and Table IIIa, showing like application of the modified sinking fund method (*supra*, p. 49). Let us indulge our fancy again and assume the two plants shown in the tables, identical in all respects, cost, age, etc., on each side of a line equally dividing a given city, one plant having provided for depreciation by accumulating a reserve, the other following the replacement plan. In any year after the ninth there is presented the startling situation that the identical service costs the consumers \$135,870 plus x dollars on one side of the line, and \$160,000 plus x

dollars to the consumers on the other side; and justly so in each case. The difference, \$24,130, is the accumulation of interest 1933 in the sinking fund (column four, Tables II and III), earned by the owner of the plant in one case, and kept by the body of consumers in the other. It is the value of the money devoted to a reserve in advance of the first replacement. In this light it is evident that the volumes of argument which have burdened the literature of the subject on the question whether valuation should proceed on a depreciated or an undepreciated rating base is wholly beside the mark, concerned as it is with a false issue. This ought to have been evident from the fact that the method of Table II, involving a 100 per cent rating base, and the method of Table III, involving a depreciated base, are convertible arithmetical equivalents.* To the court or commission engaged in valuation proceedings for rate-fixing purposes in the middle of a plant's life, the important question as to whether the proper costs are to be fixed at \$160,000 or \$136,870, is seen to be the question whether a reasonable procedure dictated the provision for replacement of structures abandoned to be made at the time, or by a reserve accumulated in advance. In an unregulated business this is a question of business policy; in the regulated business, one of state administrative policy.

We are, I think, in a position to draw final conclusions adapted to the business in hand. But before doing so, it is desirable to complete the study by describing the last of the four methods of accounting for depreciation, the straight-line method. Here an estimate of life is made and an equal portion of the replacement cost is allotted to reserves each year. Correspondingly, the residual value or rating base (replacement cost, less accrued reserves) decreases by that amount each year. No account is thus taken of the operation of interest in fixing the amount of the annual payment to reserves for replacement, nor correspondingly in fixing the resulting rating base on plant items omitting reserves. Below are two tables, illustrating the single-unit and the complex or ten-unit plant with \$100,000 successive additions, showing the straight-line method applied on the same hypotheses as before:

* This is not true of the modified sinking fund method where the rates used for owner's return and for sinking fund interest differ. Exact equivalency with the sinking fund method, under all conditions, is obtained by the slightly variant Adams method, described in the Supplemental Report, *infra*, p. 141.

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Table IV.—Straight-line Method.

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Annual payment to reserve.	Earnings of reserve.	Owner's return.	Total ratepay'rs payment (3+5).
1.....	\$100,000	\$10,000	(.....)	\$6,000	\$16,000
2.....	90,000	10,000	(\$600)	5,400	15,400
3.....	80,000	10,000	(1,200)	4,800	14,800
4.....	70,000	10,000	(1,800)	4,200	14,200
5.....	60,000	10,000	(2,400)	3,600	13,600
6.....	50,000	10,000	(3,000)	3,000	13,000
7.....	40,000	10,000	(3,600)	2,400	12,400
8.....	30,000	10,000	(4,200)	1,800	11,800
9.....	20,000	10,000	(4,800)	1,200	11,200
10.....	10,000 } 0 }	10,000	(5,400)	600	10,600
11.....	\$100,000	\$100,000 10,000	(\$27,000) (.....)	\$33,000 6,000	\$133,000 16,000

Table IVa.—Straight-line Method—Ten-unit Plant.

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Annual payment to reserve.	Earnings of reserve.	Owner's return.	Total ratepay'rs' payment (3+5).
1.....	\$100,000	\$10,000	(.....)	\$6,000	\$16,000
2.....	190,000	20,000	(\$600)	11,400	31,400
3.....	270,000	30,000	(1,800)	16,200	46,200
4.....	340,000	40,000	(3,600)	20,400	60,400
5.....	400,000	50,000	(6,000)	24,000	74,000
6.....	450,000	60,000	(9,000)	27,000	87,000
7.....	490,000	70,000	(12,600)	29,400	99,400
8.....	520,000	80,000	(16,800)	31,200	111,200
9.....	540,000	90,000	(21,600)	32,400	122,400
10.....	550,000 } 450,000 }	100,000	(27,000)	33,000	133,000
Sums.....		\$550,000 } 450,000 }	(\$90,000)	\$231,000	\$781,000
11.....	550,000 } 450,000 }	100,000	(27,000)	33,000	133,000

1935 The method has been much used because of its relative ease of computation as compared with sinking fund methods. That is, of course, a merit. It shares with all the methods which contemplate the formation of a reserve the weakness of uncertainty that attends estimates of the lives of engineering units. It involves the heaviest charges for service in the earliest years of the plant's life, when ordinarily the plant is least able to earn; in this respect being the antithesis of the replacement method. Compare tables Ia, IIa and IVa in this regard. The heavy early payments to reserve apparently reduce slightly the final total costs in the stabilized com-

plex plant; but this only means that the method finally results in a heavier normal reserve. From table IV it appears that the total costs each year for interest and reserves are not equal, as good economics and practical business would dictate, though this would to some degree be offset by the repair items in the operating expense not shown in the tables, which would be larger as the structure approached the time of abandonment.

The method, therefore, seems off balance in many respects, and I have always rejected it. But the chief objection cannot be made sufficiently evident in a short illustrative table. In a typical utility plant having items of large replacement cost and long lives, the amount of estimated reserves, the responsibility for the past accumulation of which is ordinarily placed on the owner by buyer or rate-fixing authority, is far larger by the straight-line computation than by the computation involved in the sinking fund methods. And since in the usual case it will be found that the practice of public utilities and other large business enterprises did not involve the creation of reserves until a comparatively recent date, justice will be found to require adoption of a method that will not unduly penalize the owner. Thus, in the Spring Valley Water Company's case, it appeared that a reserve was not begun until 1908; and on an estimated replacement cost of \$25,128,930 the accrued reserves or depreciation by the sinking fund method was \$3,496,847, or 13.9 per cent, while on the straight-line method it was 31.2 per cent, or \$7,835,847. (Report, p. 141.) The final report of the committee of the American Society of Civil Engineers says: "For short-lived units there is not much difference, and in some cases the straight-line theory may result in more uniform annual payments than the compound-interest theory, but, as already pointed out, there is a very great difference in the results of the two theories when applied 1936 to long-lived units." This is illustrated by the committee in a very striking table, which, with the comment of the report, I take the liberty of appending:

"For example, when 20 per cent of the life of a property unit has expired, the depreciation by the straight-line theory would be 20 per cent, regardless of the length of life of the unit, but by the compound-interest theory the depreciation would range from 16.3 per cent for a unit having a life of 10 years to 1.3 per cent for a unit having a life of 100 years.

Percentage of total life which has expired = percentage of depreciation by straight-line theory.	Percentage of depreciation under compound-interest theory corresponding to percentage of loss of service life given in first column.				
	10-year unit.	25-year unit.	50-year unit.	75-year unit.	100-year unit.
10	8.0	5.5	2.6	1.2	0.5
20	16.3	11.6	6.0	2.9	1.5
30	25.1	18.6	10.3	5.3	2.5
50	43.9	35.3	22.8	13.8	8.0
70	64.7	56.6	43.1	31.6	22.5
90	87.7	83.8	76.3	68.6	61.1"

Let us sum up. Our problem is not to devise a scheme of accounting for depreciation applicable to a new plant. It is concerned with the situation at some point part way through the lives of the units of plant. It is the problem that confronts a buyer. For value is the same in any aspect; value for rate-fixing is no different or other than value in exchange, whether by purchase or by condemnation. It would be absurd to suppose that public authority could fix a value in condemnation, and thereafter in the exercise of rate-fixing powers diminish that value to the new owner to a lower base with lower earnings.

How would the buyer of a utility plant arrive at his offer? His appraisal would involve the market value of all permanent units like land, and the replacement value of units subject to replacement. He would consider the age and expected life of each such unit with a view to determining the extent of his burden of future replacement. He would consider the established earnings and would consider to what extent they would meet operating and other expenses of service, allow for a program of replacements, and result in reasonable net earnings. If the plant in question was such that it showed a 1937 uniform sum required each year for replacements, both in the past and in the future, and that the earnings have become established and may be expected to remain established at such sums as will meet these uniform replacements, then no reserve is necessary, and no deduction need be made from replacement cost new on account of depreciation, the net earnings being assumed to be fair. In other words, such a plant has survived the jump in rates typified in the 9th and 10th years of table Ia (pp. 43, 51-52) and also has adjusted itself with the community it serves upon a \$160,000 annual basis, instead of the lower one of \$135,870, which table IIIa (p. 49) shows would have prevailed had an earlier generation of consumers been charged something toward the accumulation of a reserve. The existing status, with bygones left as bygones, could properly be assumed as a continuing economic fact. But, on the other hand, if the history of abandonments and a forecast of the future showed that the demands upon the gross earnings for replacements were fluctuating in amount, then a wise business policy would dictate to the buyer the necessity of providing a reserve for the future, and equally would lay upon the seller the responsibility for the adequacy of reserves in past years. The buyer would naturally follow the modified sinking fund method* in deducting from replacement cost new the amount of reserves he would have to provide to restore the integrity of the plant. If the seller had accumulated reserves in securities, the price for the plant unit at residual values would make him whole if his reserves were adequate. If adequate reserves had been invested in plant, then the sum of the residual values of all plant units would repay him his total investment of his own capital at present replacement values. (Supra, pp. 47-48.) If through payments of unwarranted dividends, or by lack of wisdom in estimating the necessities of the situation, the reserve was insufficient or non-existent, then the fault is his, and the buyer would not assume

*More exactly stated, the Adams method. See note, p. 52.

the burden on a chance of recovering the needed amount by raising rates.

What, now, should be the attitude of the state body charged with the fixing of rates? It should be substantially that of the buyer as above described. And while it would, as a matter of sound theory and generally of sound practice, apply the modified sinking fund method* in cases where fluctuations in yearly replacement require-

ments dictated the wisdom of a reserve, this should be done
1938 with an amount of leeway to avoid both injustice and undue complication. It should examine and consider the past practice of the company, whether under regulation or not, and give just weight, so far as possible, to what may be thus disclosed. It should consider the extent to which gross earnings have become an established fact in the community life. For example, though a comparison of tables Ia and IIIa shows that even in a stabilized plant, where annual replacements are uniform, the service cost in the later years would be less if reserves had been collected in the early years (e. g., in the tables, \$135,870 against \$160,000); nevertheless, in the plant where replacements are uniform, and the industry has somehow got past the sudden jump of the first replacement and has become stabilized with gross earnings (\$160,000) to which the community has adjusted itself, it would be unjust and unwise for a rate-fixing body to deduct depreciation on the score of a theoretical reserve never maintained and sometimes forbidden. Rather, both in justice and for its greater certainty and simplicity, it should adopt the replacement method and fix rates on replacement cost new as a base, without reserves. Indeed the rate-fixing body may well adopt the replacement method for portions of the plant (and, I think, wherever items go out of us with fair uniformity), the straight-line method of forming a reserve as respects other units of short life and the modified sinking fund method as respects costly long-lived units, in each case observing the law of the method as to rate base, etc., as illustrated in the tables. The composite thus arrived at would involve a minimum of uncertainty and injustice. This practice has, I gather, been actually followed by the Interstate Commerce Commission in its accounting rules and practice for railroads. The rate-fixing body might even direct a reimbursement of abandonments after, rather than before, replacement occurred (cf. *Kansas City Southern Ry. Co. vs. U. S.*, 231 U. S. 423, 451-2). It is thus seen that while the rate-fixing body is moved in part by the considerations that move a buyer, it may go farther and proceed with greater freedom by reason of its control over earnings.

Since the adoption of depreciation methods by the state commission involves, in its determination of whether a reserve is necessary or not, a question of administrative or business policy, that policy should be explicitly laid down as regards each corporation before it by a regulation of depreciation accounting practice. The corporation then knows what to do. If estimates for replacement
1939 prove mistaken, correction can be made intelligently. A reviewing court would not proceed on its own ideas, but with

*More exactly stated, the Adams method. See note, p. 52.

light on the policy that actuated the state's rate-fixing body, and, therefore would be better enabled to effecuate that policy. In the usual case, the court has nothing but the rate schedule before it and must act independently; it can thus give little effect to the presumption in favor of the state action.

What should, finally, be the court's attitude toward the problem of present value as affected by depreciation? Like that of the rate-fixing body, it will take the point of view of a buyer, but, unlike that body, it will feel less free to give the owner liberal treatment in the face of past errors, for its duty is to sustain the state's rates if possible. If the commission has laid down a program for taking care of depreciation, whether by replacement, modified sinking fund or straight-line method, the court will follow the indicated method, unless the injustice of its application is plainly apparent. While in previous reports I have had some doubt as to the admissibility of evidence of proceedings and findings of the rate-fixing body, in view of what has been said by this court in the Spring Valley cases, 192 Fed. 145, 124 Fed. 584, it now seems to me beyond doubt that as the state body has the right and duty to lay down a fair program covering long periods so as to justly account for the replacement of depreciated structures, so it is the right and duty of the court to follow the administrative policy if possible, and to that end to know what the adopted policy is. I cannot too strongly recommend that rate-fixing bodies should make specific findings with explanatory reasons as to its treatment of the problem of depreciation, rather than rest content with ultimate findings of present value or of a just "rating base."

But where, as here, and as is generally the case, there is nothing to show what, if any, consideration has been given the question of depreciation methods by the state authorities, or anything beyond a bare schedule of rates to be charged, then the court must determine the proper methods by its own independent judgment. I have tried to make it clear that in the usual case the modified sinking fund method would seem most applicable.* Notwithstanding this, in cases where it had not been the practice to accumulate a reserve, and where the cost of replacements has shown itself to be a fairly uniform amount, or a fairly uniform percentage of income or of capital, then there is no objection in sound reasoning, nor, 1940 as I believe, in the law as laid down, why the court should not adopt a replacement method in determining proper costs of production; and in such event it would rate at replacement cost new to determine the owner's reasonable return and include actual average replacement requirements in the yearly costs, without reserves. Or it might figure on a reserve for part of the plant, and a replacement method for the balance apparently adapted to it. Conceivably, also, the court might amortize the loss by obsolescence after abandonment had taken place, as plaintiff urges here. But I imagine that any court will feel the same hesitation in so doing that I feel here, for it involves reimbursement as to structures no longer in the in-

*See note, p. 56.

ventory of units in service, and is without precedent except where the rate-fixing body has laid it down as a proper policy.

If this elementary discussion of the question of depreciation has seemed unduly long I can offer in excuse that it has served to clarify and strengthen my own views at least. It is in order now to refer briefly to the decided cases.

The leading case is, of course, *Knoxville vs. Knoxville Water Co.*, 212 U. S. 1. In view of widespread controversy and adverse criticism of that decision I have examined the transcript of the record on appeal to the Supreme Court. As the opinion states, the master fixed the value of the water plant at replacement value new of existing property, about \$608,000. I quote extracts from the master's report: "Neither can the culminated depreciation be treated as something upon which income should now be paid. If not paid for during its own period by earnings above expenses and fair income, it is a loss of that time not to be carried forward to another generation. * * * In answer to the tenth paragraph of the order of reference (which was, What would be a fair amount to allow for annual depreciation of the water plant and property of the plaintiff from natural causes, and by wear and use, and depreciation accrued to March 30th, 1901?); annual allowance for depreciation, complainant claims 2 per cent as a fair allowance for annual depreciation. This amount was allowed in the *Chattanooga* case. * * * The proof shows that the great depreciation to be in what becomes obsolete or insufficient for increased population. * * * I have heretofore stated that past depreciation, either complete or incomplete, is not material to this case. The subject is fully treated by the witness Wheeler. I am directed to make a finding, and am content

to find and report his figures as the best evidence on the 1941 subject, being culminated depreciation \$95,987.04. The claim for incomplete depreciation seems to be abandoned."

The amount of "incomplete depreciation," i. e., accrued depreciation in structures still in use, as distinguished from the figure last mentioned covering unreimbursed cost of structures abandoned in the past and not replaced, was found to be \$77,726.51. Both figures were determined by sinking fund computations. The company also claimed interest upon culminated depreciation not repaid. From this it is evident that in adopting replacement cost new of existing plant as a basis of return, and 2 per cent annually toward a sinking fund for future replacement, the master followed the second or pure sinking fund method; and my recollection is that the evidence showed that there had been no reserve accumulated in prior years. The master thus made no provision either in rating base or in annual allowances for past abandonments not reimbursed, nor did he deduct from present replacement cost the amount of accrued depreciation in existing structures. The court, in confirming the report, expressed considerable bewilderment and doubt as to the proper disposition of the problems of depreciation and in the end expressed no opinion in that regard. He could not agree that the plant was worth as much as a new plant. On the other hand, he perceived the injustice of not reimbursing the losses incident to de-

preciation. He stated the impossibility of foreseeing abandonments because of obsolescence and inadequacy; that "cities grow in population, manufacturing enterprises and wealth to such an extent that parts and equipments which at first enter into such a plant must, in furtherance of the public interests and public necessities, be discarded as no longer suitable for use, and replaced by new constructions which satisfy the demands of the city and its inhabitants in the progress of the city's growth; and it seems impossible to anticipate, with any degree of satisfaction, what these demands will be, owing to the fact that the growth of the city in its residence population and in its industrial and commercial interests cannot be foretold or seen." He expressed the opinion that if the capital losses by depreciation thus shown were inevitable, as seemed to him to be the case, then it must be that any plant that has survived them has greater value by that fact. (This will be recognized as one of the arguments for "going value," considered hereafter). Contrasting an investment in a water works with one in Government bonds or in mortgages, the judge concluded that the investor in a utility was in a hazardous enterprise, and entitled to a 1942 higher rate of return. Without further specific application of these observations, the court summed up by saying that the master had worked out substantial justice.

The Supreme Court reviewed the whole case from the beginning, 212 U. S. 8. It is probable that their attitude toward the owner was unfavorably influenced by the fact that the company was over-capitalized, and that this was due to construction performed by the majority stockholders (p. 11). The statements in the opinion are well known and need not be quoted. I refer only to the order in which the various propositions are developed. The court first stated that in a plant like that of a water company cost of reproduction will not correctly indicate the present value unless it is diminished "by the depreciation which has come from age and use" (p. 9). In saying, "The cost of reproduction is not always the fair measure" (p. 10), there is implied by the use of the word "always" that it sometimes might be fairly used. They recognized that the complexity of a plant, with components of different ages and different expectations, rendered the amount of deduction for depreciation difficult of estimation; but that a substantial deduction ought to have been made. "A water plant, with all its additions, begins to depreciate in value from the moment of its use" (p. 13). But to offset this wastage, it is the right and duty of the owner to charge rates which will earn, annually, in advance, a sum toward a replacement reserve in addition to provision for repairs and profit. "It is entitled to see that from earnings the value of the property invested is kept unimpaired so that at the end of any given term of years the original investment remains as it was at the beginning." That the court had in mind the fact that replacement requirements would in the case before it be fluctuating and beyond the capacity of current earnings of the years of abandonments is shown by its statement that the alternative to the formation of a reserve beforehand from earnings would be the issuance of new stocks and bonds (p. 14).

The opinion concludes with the statement that if the owner fails to perform "this plain duty, * * * whether this is the result of unwarranted dividends upon over-issues of securities, or of omission to exact proper prices for the output, the fault is its own" (p. 14).

It seems to me that the criticisms that have so often been made of the Knoxville case are unfounded. I believe there would have been less misunderstanding if the court had reversed the propositions in its reasoning, and argued as follows: Here is a plant 1943 where the costs of periodic replacement of depreciated units will not be uniform from year to year. It is therefore a wise business judgment, a plain duty, to make provision in advance for replacement by charging consumers each year a sum sufficient to create an adequate reserve fund. The responsibility for thus providing for his reimbursement in a plant not under public regulation is solely on the owner. It follows that, at any time, the then present value of the depreciable units of a plant, whether to a buyer or to a rate-fixing authority, is the replacement cost, less the reserves, which should have been collected up to that time. For if the reserves are sufficient and are invested in securities in adequate amount, the owner receives capital or income on 100 per cent of his investment; if not, it is his own fault. If the reserves are invested in other units of plant, themselves requiring reserves, he is made whole in the full present value of his investment if the purchase price or rating base for income is the residual (depreciated) value of all the plant units. The court, in other words, in defining present value, has properly taken the position of a buyer. The only criticism that can properly be made of the decision is that it seems to state the rule as a principle universally to be applied, though I have noted above an apparently qualifying sentence. The Knoxville rule will, I think, usually be found applicable. But, as I have said, there will be found cases of established businesses, with long established earning capacities, and uniform replacement requirements, where a reserve will not be necessary and therefore no deduction should be made for accruing depreciation; or even cases where sound policy required an amortization or reimbursement after abandonment, in which event the abandoned property would bear interest until paid for.

An instance of the latter sort is seen in Kansas City Southern Ry. Co. vs. U. S., 231 U. S. 423; 204 Fed. 641. Grade revisions involved abandonment of portions of the old line. The Interstate Commerce Commission, by its accounting rules, required that the cost or estimated replacement value, less salvage, of the abandoned property, should be deducted from the cost of the new work, and the balance only charged to the property account, and that the cost or replacement value, less salvage of the abandoned property, should be charged to operating expenses, provided that if the amount of the charge to operating expense warranted a distribution of the same over a series of years in the future, the total amount might be 1944 charged into a "property abandoned account," to be paid off from earnings during a term of years previously approved

by the Commission. The Supreme Court referred to a distinction made by the Commission's brief between depreciation of units not replaced, and that of units become inadequate, and replaced by improved structures; a distinction not identical in kind, but similar in other respects to that which is here urged between depreciation through physical decay, and that which comes through obsolescence or inadequacy. Of the former kind, the Commission said, as set forth in the court's opinion: "The structure has served its purpose, and only past operations have benefited from it. So far as the profits of past operations have not been distributed to stockholders, they are represented in the profit and loss account, and therefore such an abandonment or depreciation is properly chargeable to that account unless a special depreciation account has been established in anticipation of such abandonments; and for such an account provision has been made in the regulations. The other kind of depreciation is the result of changes attributable to the inadequacy of the existing property to meet the demands of the future. * * * Abandonments occasioned by changes of this character are therefore chargeable to future earnings, for the reason that the improved condition of the road is not only designed to meet the demands of the future, but presumably will result in economies of operation; and so the resulting benefits will be reaped by those who hold the stock of the company in the present and the future. The railroad company may, if it sees fit, anticipate general depreciations, and make provision for them by establishing a reserve for the purpose; but if no such provision has been made, the abandonment should be taken care of by charging them to present or future operating expense." (pp. 451-2.)

The Court's attitude toward this view of the Commission is stated thus: "A statement of the theory is sufficient to show that the regulation is not arbitrary in the sense of being without reasonable basis, and there is evidence to show that the Commission was warranted in adopting it, as sustained by expert opinion and approved by experience."

The case is cited by counsel in behalf of his contention that obsolescence should be taken care of by reimbursement after abandonment. It is, however, important to observe that the court was approving a policy already laid down by the rate-fixing body, the authority of primary responsibility. We must bear in mind that in the Knoxville case, where no policy of accounting had been first laid down by the state body, the Supreme Court expressed its own attitude toward accounting for obsolescence and inadequacy as well as for physical decay by requiring a reserve to be set up in advance.

In *Railroad Commission vs. Cumberland Telephone & Telegraph Co.*, 212 U. S. 414, decided one month after the Knoxville decision, it appeared that part of the depreciation reserve had been invested in extensions to plant. The court said (p. 424): "It was obligatory upon the complainant to show that no part of the money raised to pay for depreciation was added to *capital*, upon which a return was to be made to stockholders in the way of dividends. It cannot be

left to conjecture, but the burden rests with complainant to show it. It certainly was not proper for the complainant to take the money, or any portion of it, which it received as a result of the rates under which it was operating, and so to use it, or any part of it, as to permit the company to add it to its *capital account, upon which it was paying dividends to shareholders*. If that were allowable, it would be collecting money to pay for depreciation of the property, and, having collected it, to use it in another way, upon which the complainant would obtain a return and distribute it to its stockholders. That is was right to raise more money to pay for depreciation than was actually disbursed for the particular year there can be no doubt, for a reserve is necessary in any business of this kind, and so it might accumulate; but to raise more than money enough for the purpose, and place the balance to the credit of capital upon which to pay dividends cannot be proper treatment. * * * We are not considering a case where there are surplus earnings after providing for a depreciation fund, and the surplus is invested in extensions and additions. We can deal with such a case when it arises." (Emphasis mine.)

The case has been criticised as inconsistent with the Knoxville case, and, if we view only the language employed, the criticism is justly made. For if investment in a depreciable unit is to be maintained intact by the accumulation of a reserve (the Knoxville rule) and the earning value of the unit reduced as depreciation proceeds, then the reserve must also be invested in securities or plant to earn income, and that income will be distributable as dividends. The tables illustrating both the third and fourth methods show this plainly. The court is really talking in terms of the second method,

where the income of the reserve is not distributable but is necessary for the sufficiency of the reserve. It is not likely that the court intends to forbid investment of reserves in plant and so confine them to securities; that is a business or administrative question of policy which does not enter into the problems before a court. I think that what is intended to be laid down by the decision is that the total of dividends may not be increased by an investment of reserves in plant; otherwise stated, that share capital cannot be increased to the extent that reserve funds are used to build plant units. If plant item A is built for \$100,000 and shares of stock issued, and later items B and C, costing \$50,000, are added from reserve funds, then if, following the usual accounting methods, assets are carried at cost, the balance sheet would show assets of \$150,000, and the liabilities capital stock \$100,000, and reserve \$50,000. If the plant account were shown as written off for depreciation, the item A would be entered in the assets at \$50,000, B and C at \$50,000, with liabilities showing only capital stock, \$100,000, and no reserves. In the case under discussion it was not in fact shown whether or not the extensions built from reserves were represented by issues of securities, thus illustrating one of the many reasons why the amount of outstanding securities will ordinarily be of no value in determining the fair value of the utility.

In the Minnesota Rate Cases, 230 U. S. 456-8, it was shown that

the master recognized that roadbed, ties, structures, cars, locomotives, equipment, etc., become depreciated and require renewal. On the other hand, he said, roadbed becomes more valuable by solidification and adaptation; and, further, that "a large part of the depreciation is taken care of by constant repairs, renewals, additions, and replacements, a sufficient sum being annually set aside and devoted to this purpose, so that this, with the application of roadbed and adaptation to the needs of the country, and of the public served, together with working capital * * * fully offsets all depreciation and renders the physical properties of the road not less valuable than their cost of reproduction new." The master also mentioned "knowledge derived from experience," and "readiness to serve" as additional offsets. He thus balanced depreciation against appreciation in value, and made cost of reproduction new the basis of fair returns.

The Supreme Court disapproved this summary disposition in general terms of the question of depreciation. It held that "instead of a broad comparison there should be specific findings showing the items which enter into the account of physical valuation on both sides." (P. 458.) The opinion points out that as regards adaptation and solidification of roadbed this had already been allowed in the estimate of cost of replacement in the sum of \$1,613,612. The court continues: "It is also to be noted that the depreciation in question is not that which has been overcome by repairs and replacements, but is the actual existing depreciation in the plant as compared with the new one. It would seem to be inevitable that in many parts of the plant there should be such depreciation, as, for example, in old structures and equipment remaining on hand. And when an estimate of value is made on the basis of reproduction new, the extent of existing depreciation should be shown and deducted." (P. 457.)

Here was a railroad, and it is in behalf of railroads that the claims to justice of the replacement method of accounting for depreciation are most often made. The master's presentation as quoted suggests that that method was in his mind, though there was much that had nothing to do with the question of depreciation, and his final method of reaching a result was loose and objectionable. The court's language, however, would seem to imply a rejection of the replacement method and a following, even in case of a railroad, of the rule in the Knoxville case. However, the court's decision merely is that there must be some depreciation, and that whatever there is must be specifically shown and deducted. Even in case of a railroad it would seem that there would be needed a reserve for long-lived units of large cost, like terminal stations, and therefore that present value would be less than replacement cost new; and also that deferred maintenance would have to be deducted from the earning base. It may be there is still room for the replacement method in such items as track and perhaps equipment, if, in a given case, there is shown fair uniformity of replacement costs each year. In such case the advantage of certainty as against the uncertainties involved in estimates of future lives of units as a

preliminary to estimating reserves, strongly suggests the simpler method.

In all this long discussion I have tried to develop the point clearly that it is misleading to assume that a plant that has acquired age is worth less than new, merely because it is not new; rather it is a question of whether a reserve ought to exist in the old plant. If

1948 replacement requirements can be foreseen to throw undue stress on particular years, then the physical plant is worth less by the amount of reserve that should be on hand; if replacements will be uniform and the plant is stabilized on a replacement basis, then we may in the proper case charge abandonments to repairs, maintain no reserve, and therefore base earnings on replacement cost new.

I come now to the evidence in this case. And, first a word as to the testimony offered by plaintiff in behalf of a rating base ascertained by replacement cost new without deducting depreciation. Professor Fairchild offers an excellent discussion of the subject-matter from the standpoint of the economist. (pp. 2565 et seq.) It is to be observed, however, that in his conclusions for a return on undepreciated capital he is using throughout the language and concepts of the second or pure sinking fund method. He recognizes that if depreciation had been accounted for by the straight-line method, the return would be based on depreciated value. This being conceded, together with the fact that the modified sinking fund method is in all respects the equivalent of the sinking fund method,* it is evident that the witness has not demonstrated that the plant items should be rated at 100 per cent cost. Both the second and the third methods involve the same cost of service and the same interest return to the owner.* Whether the rating base shall be cost new or cost less depreciation is a false quantity. The real question is, When shall the charges to provide replacement funds begin and end? The public is interested in the period to which replacement charges are allocated, so that consumers of one period do not pay the charges properly payable by those of another period; and that rates are fairly uniform, so far as they are affected by the accounting of depreciation. It is also interested in past accounting practices to the extent that methods should not be changed to its detriment; if a reserve has been collected, for example, a replacement method should not be adopted for that unit. It is interested to assure itself that capitalization and resulting dividends are not increased by investment in plant units of moneys in the depreciation reserves; and if Professor Fairchild means, at page 2574, that investment of reserves in plant increases the capital (which doubtless he does not), it is an example of this error. Except in such respects as this, and perhaps with the additional reservation that the state has an interest in seeing that a public utility keeps going and does not wreck itself by dissipating reserves in dividends, we may perhaps agree

1949 with the witness that the state is not concerned with the financial operations of the company to the extent of regulating the

*But see note, p. 52.

amount of its depreciation reserve (p. 2576); and that bygones in that respect may be left as bygones (pp. 2613 et seq.). Indeed, that is just what the Supreme Court did in the Knoxville case; but it refused to make up what it considered the result of past failures of plain duty by increased rates for the present and future.

Mr. C. E. Grunsky, an engineer of long experience in construction and in the study of the problems of valuation, favors what he calls the unlimited life method, the name being evidently designed to emphasize the fact that while elements of a plant have limited life, the plant as a whole never wears out. His discussion is theoretical and is not applied to the specific plant and problems before us. I am sorry to say that I do not understand the proposed method as described, with any certainty of perception. He makes it plain that he favors a rate-base at replacement cost new without deduction for depreciation. But whether his annual allowance toward replacement in the costs is calculated on the sinking fund principle, Table II above (pp. 2165, 2167), or by the replacement method, Table I, using an average of replacement requirements as shown by experience over a particular period of years (pp. 2167, 2171, 2173), I cannot be sure. Possibly the witness would agree with what I have said about occasions when the replacement method might justly be applied (*supra*, pp. 55-56, 66).

One criticism should be made of what I conceive to be a plain error of reasoning which Mr. Grunsky shares with Mr. Jones, with plaintiff's counsel, and with many theorists on valuation. This is the "value of service" argument for 100 per cent valuation of plant units. As Mr. Grunsky presents it (*Tr.*, pp. 2163-4) the argument is: If an old plant is well maintained and therefore giving 100 per cent, or perfect, service, that service is of equal or even greater value than the service rendered by a new plant; that "there is no reason, therefore, why the service rendered by a plant which has already acquired some age should be valued and paid for at any other rate or on any other basis than would be the case if the service were rendered by a new plant. It follows that the determination of rates, the determination of annual net earnings, should not be predicated upon the present value of the elements which go to make up a public utility plant." From what has already been said at

length in this report, it is evident that while the first part of 1950 the quotation is substantially true the last sentence is a complete non sequitur. Value of service has no bearing on the question of value of the physical elements of plant. It is true that if the units of plant are not increased and if their replacement cost and the expenses of operation remain constant, then the total costs for service—the gross earnings, composed of interest, annual allowances to replacement reserves, and expenses of operation and taxes—must remain the same and be unaffected by age. And, since the net earnings, the dividends, are also the same, the value of the plant as a whole, which includes reserves, if they are in fact present, as they should be, remains constant. But whether the elements of plant, not including reserves, remain at the same value depends on the reasonable requirements of a program to provide replacement.

For illustration, the second and the third methods of accounting depreciation heretofore discussed both show equal costs of service paid by the consumer, but in one case there is used a 100 per cent rate base and in the other a rating base at replacement cost new, less the reserve required to account for the progress of depreciation.

Mr. E. C. Jones, chief gas engineer of plaintiff, also testified that the plant was worth cost new less only the deferred maintenance and the amount of abandonments immediately in prospect. He estimates the amount of this deduction at \$828,916.41 (Exhibit 43), or 6.3 per cent of his appraisal at \$13,063,201.55 (Exhibit 3). His estimate includes no consideration of approaching obsolescence; it does include replacement reasonably in view, due to physical deterioration, and to ordinary inadequacy. (Tr., 1127-8.) Mr. Jones' attainments as a gas engineer, his thorough familiarity with the history and condition of the property under examination, and his fairness and integrity of mind and judgment, give great weight to what he says. His evidence has been of special assistance in showing the unreliability of life estimates and in arriving at such a decision as to probable lives as the inherent difficulty of the question permits. On the other hand, he has no knowledge or experience of corporate financing or accounting, or of the methods of providing for replacements by suitable reserves, and evidently little sympathy with any method but the replacement method. (Tr. 1135.) It results that his theory provides no fund for substantial replacement beyond the immediate future needs, nor does it take account of the fact that past reserves may have been invested in present structures.

I have referred several times to plaintiff's contention that 1951 obsolescence should be amortized after rather than before abandonment of a unit of plant. Specifically applied, it is urged that when it is seen that Martin station or other obsolete generator has been superseded by new Jones generators, using the improved Jones process for oil-gas, the demonstrated economies thereby effected are justly to be devoted to reimbursing the company for the loss of capital occasioned by the obsolescence, continuing each year until the loss is made good, with interest. On this settled program the new generator would, of course, be rated for return at replacement cost new at all times. To give the consumer a part of the advantages of the improvement, the company proposes that only half of the very considerable economies of operation shall be devoted to its reimbursement. Many advantages are urged for this plan: That it throws upon the consumer, who has the benefit of the new equipment in the shape of reduced charges, the burden of the loss by supersession of equipment otherwise in good condition; that it avoids the defect that is inherent in a system of setting aside reserves in advance of abandonment, namely, that while the life of a depreciable unit is difficult enough to estimate when physical decay alone is considered, it is practically impossible to forecast when we consider that obsolescence and inadequacy, which usually account for abandonments in a gas manufacturing plant, follow no rule as to time of their operation; that, finally, progress in service is promoted by giving a gas company an incentive to improvement of its **machinery** and its processes in the shape of increased profits. It

must be admitted that if replacement of an old machine has not been sufficiently provided for by reserves in advance, a company will naturally defer installing a new machine, and so progress is halted. It is, furthermore, true that the application of the usual formula, fair return on fair present value of the plant in service, gives to the consumer all the advantages of economies in operating costs, which plainly is not entire justice. The city's counsel agrees (Argument 451) that if obsolescence had occurred suddenly, with no opportunity to create reserves for replacement, the loss should be amortized after abandonment; but he denies that the facts here conform to the hypothesis.

If the rate-fixing body had prescribed such a system in this case, this court would be justified in following it. (Kansas City Southern case, *supra*, p. 62); it is a matter of administrative or business policy concerning which the regulatory commission has the primary responsibility. But so far as appears, that has not been done. It is, therefore, the court's duty to pass on the justice of plaintiff's claims to reimbursement of past abandonments; and it is plaintiff's duty to convince the court by clear evidence, first, that it has not had such warning of approaching obsolescence as would have impelled a careful owner to accumulate a reserve for replacement; second, that it has not in fact built up such a reserve. I agree with the city that this burden has not been sustained.

The effects of obsolescence are chiefly observable in generating equipment. The historical review of the gas industry in San Francisco contained in the argument of Mr. Searls, counsel for the city, at pages 452 and following of the argument, describes the situation very clearly. We are interested only in the abandonments of recent years. If there were unrecouped losses caused by obsolescence in early years, they are helpful only as illustrations; they offer no guide for future prediction; and there is no obligation on the present generation to make those losses good. In San Francisco the period of coal gas manufacture extended from 1854 to 1891. The water gas period extended from about 1891 to about 1906; though the plaintiff properly used its water gas apparatus after that, and the water gas sets of the Independent plant are properly in the inventory as stand-by apparatus during the years under discussion. The oil gas period may be said to have begun in 1906. The first oil gas plant was built by Lowe in Los Angeles in 1887, but later was discontinued. One was built in Chico in 1899, in Oakland in 1902, and in San Francisco, at Martin station, about 1905. (Tr. 3318 et seq.) Yet the Independent Gas Company, built in 1905, installed water gas generators. The old Jones oil gas sets were started in 1906. (Tr. 149.) Mr. Jones began his experiments which resulted in the improved process for making oil gas in 1912, and the two latest generators which embody the improvement were installed in 1915. The economic conditions which brought about the changes from coal gas to water gas, and from water gas to oil gas, are revealed in the story of the decline of California as a wheat-growing state shipping to England, and the consequent cutting off of Welsh and Australian coal, and the subsequent rise of the state as an oil producer, an interesting history which I will not here repeat. From this

it is evident that the city's counsel is fairly justified in his comment that the obsolescence which latterly has operated to displace water gas generators by oil gas generators, and the old oil gas process and machines by the improved Jones process and machines, has not been an overnight revolution, but rather an evolution evidenced by economic changes and technical experimentation and construction extending over a period of at least ten years between changes. Furthermore, since 1905 the plaintiff has had a monopoly of the gas business in San Francisco and therefore has not been forced by competition to change its methods of manufacture. My conclusion is that plaintiff had ample notice of replacements due to obsolescence, and that a reasonable business caution, especially since the announcement of the Knoxville decision, would have dictated the formation of a reserve in advance of abandonment through obsolescence. And though the improved Jones sets seem to the beholder the last word in gas generators, it seems to me a prudent owner would even now be forming a reserve for their replacement.

This conclusion is abundantly reinforced by the practice of the company and its predecessor, the San Francisco Gas & Electric Company. As early as 1902, with a prescience of wiser accounting methods and a wisdom unusual to business executives of that day, President Bourn of the latter company, after stating that prior to 1901 no provision for depreciation had been made, announced the policy of establishing a fund for "depreciation, wear and tear, and general contingencies," to which was credited \$118,505.59 for the gas department, and a like sum for the electric department. (Exhibit 97.) In 1903 \$175,000 was credited to this fund for each department. (Exhibit 98.) The sum of \$400,000 was credited in 1904 (Exhibit 58, p. 17.) On December 31, 1904, the depreciation reserve stood at \$667,873.73, gas department, and \$150,836.52, electric department, a total of \$818,710.25. (Exhibit 40, sheet 5.) On December 31, 1905, the combined balance stood at \$378,894.69 (Exhibit 32), indicating heavy writing-off during 1905, and on that date was closed into surplus account. (Tr. 3,120.) The control of over 90 per cent of the stock of the San Francisco Gas & Electric Company and its administration passed to the plaintiff at the end of 1905. During 1905 and 1906 the record seems silent as to both credits and charges to depreciation reserve except for a nominal charge of \$345 in 1906. (Exhibit 60.) In 1907 I note a charge of \$77,981.13; I do not find the amount credited in that year. I take the net charges and credits to depreciation reserve for the San Francisco Gas properties for the next four years from the city's Exhibit 91, as follows:

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	Charges.	Credits.	Balance.
Year ending Dec. 31, 1908.....	\$122,765.00	\$636,838.00	\$514,073.00
Year ending Dec. 31, 1909.....	94,152.31	636,838.00	542,685.69
Year ending Dec. 31, 1910.....	101,062.38	636,838.00	535,775.62
Year ending Nov. 27, 1911.....	107,771.62	631,671.26	523,899.64
	<hr/> \$425,751.31	<hr/> \$2,542,185.26	<hr/> \$2,116,433.95

On November 27, 1911, the properties of the San Francisco Gas & Electric Company were consolidated with those of the Pacific Gas & Electric Company. The balance in the depreciation reserve for the gas department, \$2,116,433.95, and that in the reserve for the electric department, \$1,860,140.48 (Tr. 3,120), a total of \$3,976,574.43, was transferred to surplus at the time of the consolidation, and this surplus, with other revenues and funds transferred, amounted, under the caption of "consolidated surplus," to \$7,884,853.40. (Exhibit 91, p. 1.)

The net depreciation in the San Francisco gas department of plaintiff, as charged to the depreciation reserve from the time of the consolidation in 1911 to June 30, 1916, was (Exhibit 91, p. 1):

December, 1911.....	\$17,498.96
Year ending Dec. 31, 1912.....	70,013.83
Year ending Dec. 31, 1913 (including North Beach plant)	586,369.24
Year ending Dec. 31, 1914.....	57,085.79
Year ending Dec. 31, 1915 (including abandoned mains and coke ovens).....	414,764.43
Six months ending June 30, 1916.....	64,269.35
	<hr/>
	\$1,210,001.60

It may be here noted that the total replacement charges on the present gas properties in San Francisco, from January 1, 1908, to June 30, 1916, including as charges the credits to depreciation reserve of the Metropolitan plant for the years 1908-11, then a separate property, amounting to \$127,564 (Exhibit 46, p. 66), amounted to \$1,763,316.91, or a yearly average for the eight and a half years of \$207,449. On the city's contention that property destroyed by the fire of 1906 and unnecessary mains acquired in the consolidations should not be included, the average annual replacements for the period would be \$112,523.

After 1911 the amounts credited to the depreciation reserve 1955 by the present owner seem to have been relatively less. I should judge from the balance sheet for 1913 (Exhibit 102) that the assets of the entire system of plaintiff were nine or ten times those in the San Francisco gas department. The credits to the depreciation reserve of the entire system during the years 1911-14, and the credit balances at the beginning of each year, are shown in Exhibit 91, p. 14, as follows:

Jan. 1, 1912, balance.....	\$911,642.10
Dec. 31, 1912, credited.....	2,500,000.00
Jan. 1, 1913, balance.....	2,789,446.52
Dec. 31, 1913, credited.....	1,462,462.53
Jan. 1, 1914, balance.....	2,433,492.65
Dec. 31, 1914, credited.....	1,000,000.00
Jan. 1, 1915, balance.....	2,471,862.23

As the city's counsel points out, the reserves here shown for the entire system are less than those previously carried in the San Francisco district for the gas and electric plants and not greatly above that carried in the gas department alone.

I am not discussing the sufficiency of the later system reserves. The point of this recital of facts as to past practices and amounts carried in depreciation reserves has reference to plaintiff's contention that its reserves are not sufficient to account for abandonments by obsolescence, and that such abandonments should be reimbursed afterwards rather than before, and in part of the years under examination. It seems quite apparent to me that the necessity for providing reserves for depreciation by obsolescence and inadequacy, as well as physical decay, could reasonably have been foreseen; that there is indication that it was foreseen and that provision for reserves against it was in fact made. The plaintiff, as is any owner in like case, was under a heavy burden, in connection with the contention it now makes, to justify the heavy transfers from former depreciation reserves to surplus account, and has not successfully met that burden in its proof.

I may here refer briefly to two contentions of plaintiff in this connection. I am of the opinion that, in determining costs of production and a reasonable rate of charge, neither the fire loss of 1906 nor the losses by duplication of plant incident to purchase and consolidation of public utility plants here are to be considered. Such extraordinary casualties as the earthquake and conflagration in 1906 fall on a whole community. They seldom occur and cannot 1956 be predicted, but all industries suffer in more or less equal degree. If provided for at all, it would seem that the greater risk in an earthquake country would be reflected in the current rate of return on capital. Losses by consolidation of competing plants are normally incurred, it would seem, to avoid greater losses by continued competition. It seems to me that the only losses of this character which the community can be called upon to underwrite are those where the purchase and the price paid are approved by a state commission. That was not the case here.

Accordingly, I shall determine the present value of plaintiff's plant and the reasonable annual allowance to reserve by the modified sinking fund method, including in the factors which have influenced the existing depreciation—the reserves which ought to be on hand—the effects of obsolescence and inadequacy as well as of physical deterioration. I turn therefore to the evidence of the city's engineer witness, N. Randall Ellis, whose computations are made on this approved basis. See Exhibits 93 and 92.

Mr. Ellis is well qualified to advise the court by a broad construction experience, a thorough knowledge of valuation problems, and especially by an attitude of mind characterized by fairness and integrity. His weakness, as compared with Mr. Jones, is that he has not had experience with gas-works. To remedy this the city had employed Mr. A. M. Hunt, a prominent gas engineer of San Francisco, builder of the Independent plant, to work with Mr. Ellis in preparation of the city's evidence; but before the trial Mr. Hunt

was called East on work connected with the war. Mr. Ellis says that in determining the probable lives of structures, a principal element in his depreciation study, he consulted and was in agreement with Mr. Hunt and also with Mr. Vincent, a valuation engineer on plaintiff's staff. Mr. Vincent was not called on this subject by the plaintiff and the latter should not be bound by his agreement, thus quoted. Nor in the absence of examination and cross-examination do we know how Mr. Hunt's acquiescence might be qualified. I have endeavored to allow no effect in my mind to the views of these two absent engineers, thus quoted; it may be given similar effect only, I think, to evidence that Mr. Ellis had an academic degree or the like testimony as to thorough preparation on his part.

Mr. Ellis's figures for replacement cost new, present value and the percentage it bears to cost new, amount of accrued depreciation or proper total reserve, and annual allowance to reserve, are as follows (Exhibit 93, p. 1a):

	Replacement cost, new.	Present value.	Per cent.	Total reserve (depreciation).	Annual allowance.
1913-14	\$12,127,826.11	\$9,700,661.67	80	\$2,427,164.44	\$444,327.87
1914-15	12,407,290.40	9,655,827.04	77.9	2,751,463.36	468,839.21
1915-16	12,803,103.92	9,756,503.36	76.2	3,046,600.56	504,435.01

I have already presented my findings for replacement cost new, including my determinations as to overhead and exclusions from capital. I accept Mr. Ellis's employment of 5 per cent as the interest rate for the sinking fund computations. I have then to go through Ellis's Exhibit 93, page 13 et seq., determine in the light of the evidence whether the probable lives assigned are reasonable, and recompute the figures for depreciation where I have changed his life estimates. This presents a very heavy job. In computing I have used the percentages in the tables attached to the American Society of Civil Engineers' Special Committee's Report.

It is not necessary to set forth the details in which I have changed Mr. Ellis's life estimates, though the figures are open to the parties' inspection and can be placed in an appendix, if desired. I have in all cases of change used longer lives. I can illustrate my point of view by brief discussion of the items of cast-iron mains, meters and services.

The conceivable causes of abandonment of cast-iron mains would seem to be as follows: Decay, loss of carrying capacity, breakage, leaks, electrolysis, inadequacy. There is no obsolescence to consider. As to decay, i. e., physical deterioration, cast-iron approaches the condition of the ore in the ground; and so far as the knowledge of engineers extends, cast-iron pipe may last a thousand years. The coat of rust which forms on the outside of the pipe after it is installed does not eat through the pipe but instead forms a protection against further decay. (Jones, Tr. p. 1162.) Decreased carrying capacity is a considerable factor in reducing the lives of cast-iron water mains, for by tuberculation or otherwise roughening the interior surface, the carrying capacity for water suffers a loss due to

increased friction. But apparently this is not so where the pipe is used for gas. Mr. Jones says (Tr. 1139) that old gas-holders and gas-mains, on their inside surfaces, look like new iron except for a coating of tar or a deposit from oil vapors, which are protective in themselves. I conclude that cast-iron gas-mains will last longer than cast-iron water-mains, so far as loss of capacity is concerned. Breakage is a matter that would ordinarily be confined to a single length of pipe and should be taken care of in the repair account without difficulty. This is also true of loss of efficiency by leakage, which occurs in the lead joints. It should be a fairly constant factor. The fact that this is an earthquake country is to be considered in its relation to leaks and breakage. The slight shocks that might cause leaks are not infrequent, but sufficiently irregular in the time of their occurrence to disturb the regularity of a repair account, and so may justify a small reserve. The heavy shocks like those of 1868 and 1906 are too infrequent to predict, but cause heavy loss by leakage and breakage, too great to be charged to repairs. Electrolysis causes such loss to the owners of the power that measures are promptly taken to remedy the situation. The remedy is known, the damage is promptly apparent and the loss narrowly confined. It should readily be handled in the repair account. Inadequacy of size and consequent lack of capacity to meet pressure demands not anticipated is left for consideration and this, I think, is likely to be the chief factor in causing abandonments of mains. It will affect chiefly the smaller sizes of pipe, like 3-inch and 4-inch. But Mr. Jones points out (Tr. 1166-7) that even here pressure may be increased by cross-connections and by installing looped feeders through districts of deficient pressure. When I finished hearing the testimony in this case I was strongly impressed with the feeling that while steel mains might require a reserve, the cast-iron which forms the bulk of the distribution system might best be handled on the replacement method—rate at cost new, without deducting depreciation, and charge abandonments to the repair account. I have yielded to the city's position to the extent of assigning life estimates, but I have extended the estimated lives. In view of the evidence and the considerations I have mentioned I feel that Mr. Ellis's estimates of life are too short and, therefore, that a smaller reserve will be sufficient. The effect of such changes is, obviously, to decrease accrued depreciation, otherwise stated, to increase present value, and to decrease the annual burden on the gross income for depreciation reserve, as compared with the city's figures. I have taken Ellis's figures for lives of steel pipes. For cast-iron 3-inch (including the paving element) I used 40 years as against Ellis's 25 years; 4-inch, 60 years as against Ellis's 35 years; 6 to 8 inch, 80 years, Ellis, 40 years; 10 to 18 inch, 100 years, Ellis, 60 years; 20 to 30 inch, 100 years, Ellis, 100 years. I have used Ellis's figures for drips, valves and other auxiliaries to the mains without change. Consistency would perhaps require that these things should be given the lives of the mains. But the amounts involved are small and, after all, while the processes of mathematics produce figures to the cent, the appearance of accuracy is wholly

was called East on work connected with the war. Mr. Ellis says that in determining the probable lives of structures, a principal element in his depreciation study, he consulted and was in agreement with Mr. Hunt and also with Mr. Vincent, a valuation engineer on plaintiff's staff. Mr. Vincent was not called on this subject by the plaintiff and the latter should not be bound by his agreement, thus quoted. Nor in the absence of examination and cross-examination do we know how Mr. Hunt's acquiescence might be qualified. I have endeavored to allow no effect in my mind to the views of these two absent engineers, thus quoted; it may be given similar effect only, I think, to evidence that Mr. Ellis had an academic degree or the like testimony as to thorough preparation on his part.

Mr. Ellis's figures for replacement cost new, present value and the percentage it bears to cost new, amount of accrued depreciation or proper total reserve, and annual allowance to reserve, are as follows (Exhibit 93, p. 1a):

	Replacement cost, new.	Present value.	Per cent.	Total reserve (depreciation).	Annual allowance.
1913-14	\$12,127,826.11	\$9,700,661.67	80	\$2,427,164.44	\$444,327.87
1914-15	12,407,290.40	9,655,827.04	77.9	2,751,463.36	468,839.21
1915-16	12,803,103.92	9,756,503.36	76.2	3,046,600.56	504,435.01

I have already presented my findings for replacement cost new, including my determinations as to overhead and exclusions from capital. I accept Mr. Ellis's employment of 5 per cent as the interest rate for the sinking fund computations. I have then to go through Ellis's Exhibit 93, page 13 et seq., determine in the light of the evidence whether the probable lives assigned are reasonable, and recompute the figures for depreciation where I have changed his life estimates. This presents a very heavy job. In computing I have used the percentages in the tables attached to the American Society of Civil Engineers' Special Committee's Report.

It is not necessary to set forth the details in which I have changed Mr. Ellis's life estimates, though the figures are open to the parties' inspection and can be placed in an appendix, if desired. I have in all cases of change used longer lives. I can illustrate my point of view by brief discussion of the items of cast-iron mains, meters and services.

The conceivable causes of abandonment of cast-iron mains would seem to be as follows: Decay, loss of carrying capacity, breakage, leaks, electrolysis, inadequacy. There is no obsolescence to consider. As to decay, i. e., physical deterioration, cast-iron approaches the condition of the ore in the ground; and so far as the knowledge of engineers extends, cast-iron pipe may last a thousand years. The coat of rust which forms on the outside of the pipe after it is installed does not eat through the pipe but instead forms a protection against farther decay. (Jones, Tr. p. 1162.) Decreased carrying capacity is a considerable factor in reducing the lives of cast-iron water mains, for by tuberculation or otherwise roughening the interior surface, the carrying capacity for water suffers a loss due to

increased friction. But apparently this is not so where the pipe is used for gas. Mr. Jones says (Tr. 1139) that old gas-holders and gas-mains, on their inside surfaces, look like new iron except for a coating of tar or a deposit from oil vapors, which are protective in themselves. I conclude that cast-iron gas-mains will last longer than cast-iron water-mains, so far as loss of capacity is concerned. Breakage is a matter that would ordinarily be confined to a single length of pipe and should be taken care of in the repair account without difficulty. This is also true of loss of efficiency by leakage, which occurs in the lead joints. It should be a fairly constant factor. The fact that this is an earthquake country is to be considered in its relation to leaks and breakage. The slight shocks that might cause leaks are not infrequent, but sufficiently irregular in the time of their occurrence to disturb the regularity of a repair account, and so may justify a small reserve. The heavy shocks like those of 1868 and 1906 are too infrequent to predict, but cause heavy loss by leakage and breakage, too great to be charged to repairs. Electrolysis causes such loss to the owners of the power that measures are promptly taken to remedy the situation. The remedy is known, the damage is promptly apparent and the loss narrowly confined. It should readily be handled in the repair account. Inadequacy of size and consequent lack of capacity to meet pressure demands not anticipated is left for consideration and this, I think, is likely to be the chief factor in causing abandonments of mains. It will affect chiefly the smaller sizes of pipe, like 3-inch and 4-inch. But Mr. Jones points out (Tr. 1166-7) that even here pressure may be increased by cross-connections and by installing looped feeders through districts of deficient pressure. When I finished hearing the testimony in this case I was strongly impressed with the feeling that while steel mains might require a reserve, the cast-iron which forms the bulk of the distribution system might best be handled on the replacement method—rate at cost new, without deducting depreciation, and charge abandonments to the repair account. I have yielded to the city's position to the extent of assigning life estimates, but I have extended the estimated lives. In view of the evidence and the considerations I have mentioned I feel that Mr. Ellis's estimates of life are too short and, therefore, that a smaller reserve will be sufficient. The effect of such changes is, obviously, to decrease accrued depreciation, otherwise stated, to increase present value, and to decrease the annual burden on the gross income for depreciation reserve, as compared with the city's figures. I have taken Ellis's figures for lives of steel pipes. For cast-iron 3-inch (including the paving element) I used 40 years as against Ellis's 25 years; 4-inch, 60 years as against Ellis's 35 years; 6 to 8 inch, 80 years, Ellis, 40 years; 10 to 18 inch, 100 years, Ellis, 60 years; 20 to 30 inch, 100 years, Ellis, 100 years. I have used Ellis's figures for drips, valves and other auxiliaries to the mains without change. Consistency would perhaps require that these things should be given the lives of the mains. But the amounts involved are small and, after all, while the processes of mathematics produce figures to the cent, the appearance of accuracy is wholly

illusory. For the principal factor in producing the result is the life assigned, which is an estimate, an effort of judgment with the inherent possibility of human error. I have followed the same plan as regards other structures.

As regards meters and services, I still have the impression that it ought to be possible to account for losses by abandonment by the replacement method. However, obsolescence is a factor in the case of meters, and services become too small with the increasing use of gas appliances. Mr. Jones says that this inadequacy may be remedied by laying a second service pipe (Tr., 1159, 1161). I have estimated the reserve by using 25 years for services and 20 years for meters, as compared with Ellis's estimate of 15 years for each item.

My own computation has extended as far as determining, for the structures in the agreed Jones inventory and appraisalment, the present value and the proper annual allowance to depreciation reserve for the years ending on June 30th in 1913, 1914, 1915, 1916. To obtain the figures comparable with those already given (Ante, pages 18, 19), which do not account for depreciation, these figures must be adjusted to show averages for the years in question, 1913-14, 1914-15, and 1915-16, to show the effect of depreciation figures on additions and betterments, on exclusions from capital and the like. In other words, I have re-figured pages 13 to 32, inclusive, of Mr. Ellis's Exhibit 93, and also Martin station. It has seemed wise at this point to submit my figures to the parties, whose engineers have completed the computations in co-operation.

The result of their work is shown in the following table, which I accept as correctly carrying forward my findings. In the first column is found, averaged for the three fiscal years, the replacement cost new of all structures, including the result of additions and betterments and of abandonments, that of the property excluded from the rate base entitled to a return, being duplicated mains and paving, and the net result, the average replacement cost new 1960 in each year of the structures used and useful. The second column shows, similarly, the allowances to be made in the expenses in each fiscal year toward the reserve for ultimate replacement of structures, the so-called depreciation reserve; it is the net figures, of course, which interest us. The third column, and the figures entitled "net" there shown, gives the present value in the different years of the property under appraisal. The difference between these figures and the corresponding items in the first column will of course be the existing depreciation.

Present Value and Annual Allowance to Reserves of Structural Property, San Francisco Gas Department.

Year.	Replacement cost new.	Annual depreciation allowance.	Present value.
1913-14. Total structures.....	\$13,600,296.01	\$353,050	\$12,043,563
Less exclusions.....	806,287.70	4,197	767,945
Net.....	\$12,794,008.31	\$348,853	\$11,275,618
1914-15. Total structures.....	\$13,853,470.50	\$376,888	\$12,041,584
Less exclusions.....	788,104.30	4,208	756,629
Net.....	\$13,065,366.20	\$372,680	\$11,284,955
1915-16. Total structures.....	\$13,965,192.00	\$384,738	\$12,429,226
Less exclusions.....	788,104.30	4,219	745,301
Net.....	\$13,177,087.70	\$380,519	\$11,683,925

A computation shows that the existing depreciation, or what I have preferred to think of as the total reserve in cash, securities, or preferably in property in use, that should exist against future replacement of structures was: 1913-14, \$1,518,390; 1914-15, \$1,780,411; 1915-16, \$1,493,162. In terms of percentage condition we have the following for the three years respectively: 88.1 per cent, 86.3 per cent, and 88.6 per cent. This compares with Ellis's percentages as follows: 80 per cent, 77.9 per cent, 76.2 per cent. (Exhibit 93, p. 1a, ante p. 76.)

An all-over retrospect of the appraisal of structures develops some surprising results. I have denied the city's claims to exclusions from useful structures in an amount, roughly, of \$600,000. 1961 In response to strong evidence on the part of plaintiff of the durability of its structures, I have extended the expectant lives used in measuring depreciation. This has had the result of raising the present value of the structures from \$1,500,000 to \$2,000,000 above Ellis's figures in the various years concerned; and consequently has increased pro tanto the interest burden the rates must yield. But, on the other hand, the use of longer lives has, in my figures, diminished the allowance to reserves, as compared with the city's figures, by from \$96,000 to \$124,000 yearly. Comparing the final results by adding a year's interest on the respective present values at 7 per cent to the respective annual allowances to reserves, my total costs to be met are only from \$11,000 to \$17,800 greater than the city's figures show. In a computation of this magnitude differences like this are negligible. If 6 per cent be used, the results are almost identical; the city's figures being greater in 1913-14 by \$977, and in 1915-16 by \$7,270, mine being greater in 1914-15 by \$1,598. Suppose we adopt the contention of plaintiff and use the replacement method of accounting depreciation, figuring interest at 7 per cent on my replacement cost new and average annual replacements other than through obsolescence at \$125,000, used by plain-

tiff's counsel in argument. The figures resulting from my findings above are from \$67,800 to \$117,500 greater than those that would be thus obtained by the replacement method, and average \$93,700 greater during the three years. This is quite a balance to devote toward obsolescence according to plaintiff's views, or in satisfaction of his claim to a higher interest rate.

I conclude that both parties should be satisfied with the appraisal.

Working Capital.

Both parties concur that an allowance for working capital should be included in the capital entitled to a return in the way of interest. They diverge widely, however, in the amounts of their estimates. The presentation in the evidence is very long and quite complex.

The plaintiff presented two calculations. The first (Exhibit 15) was an estimate based on averages over the four years from 1912 to 1916, that is, the sum of three months' requirements for operating expenses, taxes and reserves and of six months' requirements for current construction. These sums are given as, respectively, 1962 \$716,572.05 and \$274,676, a total of \$991,248.05. I have some doubt whether three months is not too long a period to assume as existing before the operating revenue would be in hand to pay the normal costs. I also feel that working capital, as ordinarily understood and accounted in proceedings like this, has nothing to do with construction requirements. In the ordinary view the working capital is a substitute for earnings, the collection of which is necessarily deferred beyond the outgo which has made the earnings possible. Earnings are not dedicated to new construction except for replacements through the medium of the depreciation reserve. Additions and betterments call for new capital, not working capital. To this the plaintiff answers that money and supplies must, in practical operation, be provided in advance of their payment for new construction, and if allowed a return while necessarily idle, as would be proper, can as well be included in the significance of the term working capital along with the costs of operation. But it is, I think, usual, certainly so in previous cases in this court, to reckon the allowance for interest during construction upon current additions and betterments for a period long enough to include the advance provision for capital. There is presented at once the question whether there is not a duplication in plaintiff's claim for construction working capital and for the interest during construction already allowed at 3 per cent on the yearly additions, and betterments. It will be remembered that this was agreed between the engineers of the parties in determining the overhead upon capital (ante, p. 16). Plaintiff says the allowance there followed the existing bookkeeping practice of the company, which entered interest on construction jobs only of \$5,000 and over, and then only from the time construction began; consequently there was no allowance for the large amount of small construction and no proper recognition of the fact that money must be in hand before construction. I think this contention is

true; it struck me at the hearing that the 3 per cent agreed on for interest during construction was low. The record does not give exact data upon which a correction should be made, but it will be borne generally in mind in determining the proper allowance for working capital. It is agreed that the estimate presented includes materials and supplies on hand which have already been appraised in the agreed Jones inventory and appraisal. The claim for working capital must therefore be diminished by \$127,000 odd, by plaintiff's calculation, or by \$150,000 odd, by the city's estimate.

The latter is apparently correct; probably plaintiff's counsel 1963 has omitted the overhead that was separately added in the process of appraisal.

Plaintiff relies, however, on its second computation (Exhibits 23, 36). This is aimed to show the actual working capital on hand as shown by its books. Here, however, we have the condition which handicaps the investigation throughout, viz.: there are no separate accounts of the gas department in San Francisco. Plaintiff's method is, first, to determine the average working capital on hand, as shown by its books to be available for the whole system, and then apportion an amount to the San Francisco gas department on the ratio of actual expenditures there for expense and additions, to the like expenditures on the total properties. The theory of apportionment sounds fair, but I have grave doubts if it is. If gas sold were paid for daily there would be little, if any, working capital required. It is the interval between expenditures and receipts that must be kept bridged by working capital, and the length of that interval and the amounts of the expenditures determine the amount of working capital necessary. It is not a self-evident proposition that the length of that interval as between the San Francisco gas department and the balance of the system is the same, and that is what the plan of apportionment by comparative expenditures seems to assume. Furthermore, if, as plaintiff contends and assumes, we regard working capital as available for construction as well as operation, the difficulty of accepting an apportionment by comparative expenditure increases. For the interval between expenditures for construction and reimbursement of working capital might, and one would think necessarily must, be much longer than the interval in the case of operating expenditure and receipts. This would require increased working capital. The point is pertinent because of the fact that plaintiff was in the years in question engaged in large construction outside San Francisco, especially hydro-electric installations, and the city claims that its total working capital requirements were larger by that fact. Plaintiff claims that the exhibits eliminate these large construction projects, but I am not convinced that this is so.

Including the year 1912-13 for comparison, plaintiff's Exhibit 36 shows, on the plant of apportionment described, the following amounts of working capital actually on hand, on a monthly average: 1912-13, \$603,243.74; 1913-14, \$333,737.24; 1914-15, \$709,069.54; 1915-16, \$1,176,583.30. These figures include the duplication of materials and supplies mentioned before. According to Exhibit 19, floating debt interest was paid, in the San

Francisco gas department apportionment, as follows: 1912-13, \$7,905.60; 1913-14, \$29,710.24; 1914-15, \$29,779.47; 1915-16, \$7,669.91. On the theory that the payment of floating debt interest indicates a depletion of working capital, plaintiff argues that the amount of working capital available in 1915-16, \$1,100,000 odd, is seen to be a fairly normal working capital, and that the amounts on hand in 1913-14 and in 1914-15 are demonstrated to be inadequate. There is strength in the argument. On the other hand, there is evident no uniformity of correspondence between amounts of floating debt interest and working capital in the different years. Thus, interest in 1912-13 is small and practically the same as that in 1915-16, but working capital is half as great in the former as in the latter year. The same is true in comparing the years 1913-14 and 1914-15, where interest is large. It seems as easy to conclude that the \$600,000 of the first year is a normal working capital as to conclude that the \$1,100,000 of the last year is the normal amount. It seems plain that this lack of correspondence is due to undisclosed factors in the problem, and I very much suspect it may be explained by unusual construction outside San Francisco.

The various objections I have urged to the plaintiff's estimates so weaken their effect that they fail to convince my judgment. And this doubt is increased by the fact that the amount claimed is far in excess of any amount ever claimed or allowed in this court. I think plaintiff's counsel is right in saying that the matter has not usually been understood or properly presented; but it needs very clear evidence to justify allowances involving so radical a departure from settled paths.

I turn to the city's evidence. Mr. Ellis presented a computation (Exhibit 95) by which he obtained \$260,000 as an adequate allowance for working capital in 1913-14 and \$275,000 in the two years succeeding. His method can be only briefly indicated. Taking the city's estimate of what the gross revenue for the year 1915-16 at the rates specified in the ordinance would have been, and the city's audit of what the year's disbursements should be (matters for later consideration in this report), Mr. Ellis by averaging finds what a typical month's receipts and expenditures would be. Having then determined the times and amounts in which the revenue for one month was received on the average, as shown by the books, he constructs a table showing the cumulating of receipts over a period of six months. After a like determination of the usual times and amounts of payments for expenses, reserves and taxes, he constructs a table of cumulative disbursements over a like period. The times selected are at like intervals, so that a compound table of both receipts and disbursements can be then constructed which shows the deficits to be taken care of by working capital and, by reason of the extension of the period over six months' operation, also shows a finally stabilized condition. The amount necessary for cash working capital he thus determines to be \$275,000 (Table V, Exhibit 95).

In examining this study during preparation of this report, it seemed to me that since gas was made, delivered, and to a large extent paid for, one month before meter-readings began, the receipts

shown in the table last specified should be shown in each case one month later. This would considerably increase the deficit and the consequent allowance for working capital. I have called the parties' counsel and engineers into conference, and find all in agreement to the effect that Mr. Ellis has properly accounted for the situation I speak of. While I am not entirely assured in my own mind that this is so, there is no reason why the point should be pressed under the circumstances.

If plaintiff's presentation were of actual balances on hand in the San Francisco gas department, I think I should prefer that as a fair demonstration of actual needs for working capital. Since it is not that, but an apportionment that seems faulty, I accept Mr. Ellis' study as a fair guide to my judgment, though not conclusive as to the specific amount to be allowed. The sum sought for is, by hypothesis, such as will be sufficient without borrowing. No floating debt interest will be allowed in determining necessary expenditures.

I find, on all the evidence, that the sum of \$300,000 as working capital in all three years is an adequate amount and fair to each party.

Patent Rights.

Mr. E. C. Jones, chief gas engineer of plaintiff, and his son, Mr. Leon B. Jones, assistant gas engineer, on an application filed May 23, 1912, were on March 10, 1914, granted United States Letters Patent for an improved apparatus for manufacturing oil-gas; and on October 19, 1915, on an application also filed May 23, 1912, were granted letters for the process. On November 30, 1915, 1966 they granted to plaintiff the exclusive right to use the process, and to make and use, but not to sell, the apparatus, together with future improvements in either process or apparatus made during the lives of the patents; the rights granted being transferable, but restricted as to place to a number of named counties in northern and central California. Despite the late date of the grant, plaintiff's beneficial right covered the period in suit, for the prior installation of generators embodying the Jones patents at the Metropolitan and the Potrero stations, with the patentees' consent, conferred an implied license to use them during their life in the San Francisco district; but this license was not exclusive. The contract underlying the grants (Exhibit 61) recited that the company had permitted the patentees to use its plant and facilities for experimentation and commercial demonstration of their inventions; had expended in alterations in its Metropolitan plant a sum exceeding \$100,000, and also had expended in erecting two new gas generators at the Potrero station embodying the inventions a sum exceeding \$215,000; that continued operation of all said new or altered apparatus under the patentees' direction had demonstrated the great utility and value of the inventions and that they could be utilized "to the great pecuniary advantage" of the plaintiff company; that the company had allowed the patentees to exhibit the apparatus to many persons interested in gas manufacture in this country and Europe as a demonstration of the utility and value of their inventions, and that

the patentees regarded the privilege of future such exhibitions as of great value to them. It was then agreed that for the grants first above referred to the company would pay the patentees the sum of \$46,066.67, and would allow full opportunity for future exhibition of the generators, and so forth.

The question is, At what figures these rights of the company shall be taken into the rating base? It seems to be agreed that the amount actually paid in 1915 is already represented in the amount hitherto added as additions and betterments.

The presentation of plaintiff's case in the form approved by its counsel does not primarily involve the giving of a value to these patent-rights. Counsel in argument stated in substance that the evidence as to their value seemed to involve such enormous sums that he preferred the more conservative course of giving them consideration in his conception of the proper treatment of losses by obsolescence. It will be remembered that his argument was that 1967 no new invention would be installed by a man of business unless its savings were available to him to recoup losses of capital abandoned to make way for it; that the patent monopoly would enable him to compel a price adequate for his recoupment; and that in a proceeding like this it was equitable to divide the savings with the consumer and apply the company's share to reimbursement of the loss by abandonment, meanwhile rating the new property at value new. I have said that there was strength of reason in this plan, but that it involved a matter of administrative policy that was primarily for the state's regulatory body. I have not followed this plan for this reason and for the further reason that it appeared obsolescence could have been foreseen and provided for, and apparently had been provided for. This means that the question of value of the rights must be now considered.

The evidence is not very full on the part of plaintiff. And due perhaps to plaintiff's position as to obsolescence, there was little cross-examination by the city and no contrary evidence. With oil at 68½ cents a barrel to plaintiff during the years 1912-16, Mr. Bridges estimates the savings under the Jones process at 2½ cents a thousand feet of gas manufactured. (Exhibit 62.) In Table X of his supplemental argument, Mr. Bosley estimates the savings shown by the evidence at 2+ cents for the first two years and over 4 cents for the year 1915-16; or, in sum total, \$103,530.39 for 1913-14, \$132,419.45 for 1914-15 and \$258,557.81 for 1915-16. A just criticism of these estimates is that they give no influence to the economies due to larger production. Mr. Britton, general manager of plaintiff, speaking of results attained in 1916-17, testifies that the new Jones generators effected a saving of two gallons of oil per thousand feet of gas and over one cent a thousand in labor costs of manufacture. (Tr., 2248 seq.) Projecting the savings over the sixteen remaining years of the letters patent, he computes the aggregate savings at \$7,630,300. (Tr., 2251.) Mr. Vincent computes the present worth on June 30, 1916, of these future savings at \$4,203,300. (Exhibit 67.) While apparently the estimates are made on conservative bases, it is, of course, true that forecasts like

this are full of uncertainties; for example, oil may rise to a price prohibitive for gas consumption on the present scale, or other inventions or even substitutes for gas may diminish the value of the Jones Patent.

There is no doubt that these patents are property, and of great value. It is also true, I think, that justice demands that the utility company should profit in some substantial proportion by the economies brought about by its ability in management or its improvements in methods of manufacture. There is no good reason why the consumers should get all the advantages that are the fruit of the genius of these inventors. If by the terms of their employment Mr. Jones and his son had been bound to assign their patents to plaintiff without further compensation, and had done so, the city could not justly claim that the company should have no part of the savings effected. The patents would have to be valued. But in view of the fact that the company and the patentees, dealing presumably at arms' length, have reached a figure of about \$46,000 as the value of exclusive rights throughout Northern California, I am as much embarrassed as was plaintiff's counsel in concluding that in San Francisco alone the rights are to be valued for purposes of return at four million dollars or any substantial fraction of that sum. And how are we to compare in value the full rights obtained by express grant in 1915 and the restricted rights arising by implied license in the prior years? In view of the state of the evidence, it seems to me better to pass the whole matter for future consideration in connection with the rates of later years, when the state commission can pass on it with full evidence before it. On the record before me I do not see my way clear to add any figure to the rating base on account of these patent rights.

Going Value.

In approaching one of the most difficult problems in any valuation proceeding, it may be well to pause for our bearings and consider just what stage we have reached. We are engaged in determining the value of the instrument of gas production in San Francisco, the property used and useful in serving gas, the purpose being to determine a base upon which returns to the owner shall be calculated, and, as to the depreciable part of it, to determine the necessary provision in reserves for periodic replacement, both of these constituting elements in the reasonable cost of production and delivery of gas, our ultimate problem. The necessities of careful appraisal have required us to proceed by units of property. Units of real estate have been appraised at market value. Units of structural plant have been appraised at current standard replacement costs. An estimate of necessary working capital has been made. All of the property has thus been covered, except the franchise, which is later considered and for the moment may be left out of view. Is the value we seek the sum of these units? Plainly not. The test of value in this proceeding is the same as in any judicial investigation of value, viz: market value, value in ex-

change, what a willing buyer and a willing seller would agree upon. The appraisal just described is not of the property before us. It fails to recognize that the elements of the property have been unified into an organic whole. It fails also to recognize that the property before us has age, a history, and with age and history an environment and an established business. The acquirement of age would influence a buyer in two ways—one a factor of decrease of the value found in the way described; the other a factor that might in given cases increase value as found to a substantial degree. The factor of decrease is, of course, what is usually called depreciation, already discussed and determined; what I have preferred to view as the amount of reserves for replacement that prudent accounting would have dictated. The factor of possible increase is what we are concerned with under the title of Going Value. Let me explain why I characterize the increase with age as "possible."

If the plant under appraisal were just completed, but as yet without business, it would be worth the figures we have reached, but without any deduction for depreciation, and without any addition for going value. (It would be worth something more than we have reached, due to the fact that the interest during construction has been carried on each unit to the period of operation, and the parts assumed to go into operation successively as completed.) A buyer would pay at least value new for such a plant; to say he would pay less, e. g., scrap value, is to assume the plant was not worth building. Suppose now the plant has acquired age. If the population of San Francisco had decreased from 500,000 people when the plant was built to 5,000 when the appraisal took place, there would obviously be no going value or even replacement value; it would have a scrap value only. An instance of this second class of public utility plants is familiar to us in the case of the electric street railroads of this country. Ten years ago they were among the most successful public service enterprises, well built and maintained, furnishing a service absolutely necessary to community life. A few years ago, even before the recent abnormal increases in operating costs, many of them were in the hands of receivers or creditors' committees. With rates fixed by long custom, the competition of automobiles reduced their earnings to a point where they could no longer pay their way. It would seem that the buyer of a road in such a condition would be unlikely to add anything to his price for going value; the road would probably sell for an amount anywhere from scrap value to replacement cost less depreciation, depending on circumstances. But if the road in the hands of the new owner possessed sufficient inherent strength by favorable location and wise management to weather adversity and win its way back to its original prosperity or a greater prosperity, then it would be fair to say that it had increased value as compared with an untried enterprise. It would offer evidence of stability, of seasoned earning power that would be attractive to the buyer or investor. Such a road, if appraised at replacement cost less depreciation and plus its reserves, ought to bring more money upon a sale than a new road of equal cost, without business but about to start

service in a new field. The amount of that difference, the additional amount that a buyer would pay over the physical appraisal on the basis stated is what we call going value.

The discussion makes plain, I think, the fallacy of the argument against an allowance of an amount of capital in recognition of going value urged by certain writers and rate-fixing authorities, by the counsel of San Francisco in the Spring Valley Water cases, and perhaps a little more faintly here, viz: that an appraisal by market value for land and replacement cost, less depreciation for structures, is an appraisal of a going plant, and, therefore, inclusive of going value, since otherwise the plant, if not a going concern, would only be worth scrap value. As I stated in the Spring Valley report, the apparent dilemma is falsely constructed. The comparison is made between the successful enterprise and the one that has utterly failed, the second plant in the illustrative discussion above. It fails to take account of the first type of plant referred to, that which is new, without business, but with the probability of business, which is worth cost new. It is this point, with the additional deduction of depreciation, that we have reached in this appraisal, and we have still to take account of the additional value of the going concern that is before us.

It is evident that this "going value," though described by the Supreme Court as a right of property protected by the Fourteenth Amendment, is not a separate thing, an independent productive unit like a generator. It is rather a quality, an element of value attached to and inhering in every tangible part of the property—what Judge Savage, in one of the Maine Water District cases, and Judge Farrington of this court, in the 1903 Spring Valley Water case (192 Fed.), called a characteristic of the property and its business. It has also been well called the value of a survived risk. Value here, as elsewhere, does not depend on cost. Usually costs have been incurred; expenditures for deficits; expenditures for losses of property by casualty, by mistakes or otherwise; expenditures to get new consumers or new kinds of business by solicitation or education. But if these risks of loss have not only been survived, but have actually not been experienced; if the enterprise has by fortunate chance, through location, able management or wise construction, been successful from the beginning, it seems to me that a buyer would recognize the additional going value of such a plant and business, equally as he would where losses have been successfully survived.

In my report in the Spring Valley Water Company cases (printed pages 181-202) I have reviewed the law on this subject as developed by the Supreme Court of the United States concerning intangible values generally, and specifically the value of a successful going concern. I may refer the court to what was there said. It was approved by the reviewing judge, and represents the law of this court as well as of the ultimate tribunal. In brief, it amounts to a mandate to find a going value over and above the sum of the value of the units of plant as appraised by cost of reproduction.

The review of decisions upon this subject contained in the Spring

Valley report should be supplemented by a reference to *Denver v. Denver Union Water Co.*, 246 U. S. 178, decided March 4, 1918, after the Spring Valley report and decision, and after the present cases were heard and submitted. That case on its facts was stronger than the cases at bar, for the reason that the franchise of the Denver company had expired and its occupancy of the streets with its mains could be terminated by the municipal authority. There, as here, the city, while admitting that a going value should be included in an appraisal for purchase, denied that it should be considered in an appraisal in a rate-fixing case, and contended that where property had been appraised by market value and, as to structures, by replacement cost less depreciation, going value had been sufficiently recognized; that, to quote the master's report, "such property right has been sufficiently considered when the physical property of the plant has been appraised at a sum in excess of its 'junk' or 'wreckage' value." The master denied this contention on the authority of the *Des Moines Gas case*, 238 U. S. 153, 165. His method of appraisal and of reasoning is an anticipation of what I have said here and in the Spring Valley report. The Supreme Court fully approved the master's reasoning, his reliance on the *Des Moines case*, and the amount allowed for going value. (246 U. S. 183186, 191-2.) The decision is thus in exact parallel with the present case and is of controlling authority.

We may here notice, in advance of our discussion of the evidence, what the master in the Denver case had to say in determining the amount to be allowed. After stating that the estimates of witnesses warranted an appraisement of the element of going value at \$1,100,000, he referred to the monopolistic position of the water company in a semi-arid country, and concluded thus: "There is no absolute standard by which the fair value of this element can be determined and I adopt \$800,000, because no matter how often I have considered the evidence and the arguments, my mind always comes back to this amount as reasonable and fair to all the parties." I quote this because it was evidently satisfactory to the Supreme Court.

I wish to pause, also to add to my résumé of the law as contained in the Spring Valley report, a thought about "good-will." It will be recalled that in the *Consolidated Gas case*, the Supreme Court said there was no room for a good-will value, where the Company possessed a monopoly in fact. The plaintiff here has such a monopoly. It occurs to me, however, that the last word has not been said when we recognize merely the absence of other companies. For there is still competition with other fuels for heating purposes—oil, coal, wood and electricity, oil and electricity being especially active, and with other illuminants, especially electric energy. When this competition is met with some success, it would seem that there is in fact an element of choice by consumers inconsistent with the idea of monopoly, and that there is, therefore, a logical basis for here considering good-will as an element in going value. I have, however, given it no consideration or influence in my determination of value.

The evidence is too long to be reviewed in this report. The city, contending that no allowance should be made for reasons already sufficiently indicated and disapproved, offers no assistance in reaching a figure. Mr. Ryan, for the plaintiff, offers a very complete and careful study. The figures for going value reached by him by different methods of computation vary from \$2,340,880 to \$5,396,232. His final judgment is that the reasonable amount to be added to cover the element of going value is \$3,150,000. Professor Cory of the University of California estimated the value at \$3,208,560; Mr. Vincent at \$3,000,000.

Mr. Lowe, a witness for the city, stated that the going value of a business such as this would be several million dollars, but that, as a buyer, he would pay nothing on this account because of the attitude of the Railroad Commission against any recognition of going value. Since this body passes on sales of utility properties, and its attitude would influence the price a buyer would pay, the city thus seeks to undercut the position I have always maintained, viz., that value for rate-fixing is value in exchange. If the commission's position is accurately stated, it is contrary to law and could not be sustained if tested in court. I doubt if such a position, if ever held, would now be taken, since the Denver case has resolved all doubts. But the city will hardly contend that this court should allow the administrative body's error to destroy the vitality of a rule of valuation announced by the highest court in the land; and a recognition here of the error would only perpetuate its influence.

Mr. Ryan offered no estimate of value by what is called the development expense method. The books of account of plaintiff and its predecessors were destroyed in the conflagration of 1906. During the hearing, however, there were found certain old books of statistics, gathered from the books of account. From these Mr. Bridges, auditor of plaintiff, made a computation, shown as sheet 18 of Exhibit 58, whereby it appears that in the period from 1873 to 1916, assuming 8 per cent to be a proper rate of return on capital applicable to the entire period, the aggregate deficits amounted to \$10,327,062.51, if intangibles were included in the capital, and \$6,139,600.03 if intangibles were excluded. If 7 per cent were used as the rate of return, the latter figure would become \$2,055,550.20.

I have a few words to say about these so-called Development Expense methods. They are favored by many authorities, notably the Wisconsin Railroad Commission, and there are expressions in several decisions of the Supreme Court that indicate that the method has been considered, though not in so many words approved. All such methods, when applied to old plants, seem to me as utterly worthless as the method of valuing a plant by its original cost. The usual form in which the method is applied carries forward to the next year's capital any profit or deficit in any particular year, the final figure, whether of profit or deficit, being the end sought. If this final figure is a deficit, it is called going value or development expense and is added to the appraisal; if it is a profit nothing is done with it. Obviously we have here a final result showing the operation of the principle of compound interest. Hence my first

objection, one of a practical sort, namely, that any error made in the computation during the early years will be enormously multiplied in a computation covering forty years. Mr. Bridge's study seems to be an aggregation and not a cumulation of deficits and profits, and so not open to this objection. But it is open to all the other objections. One set of objections has to do with the reliability of the sources. Old books of account, even if honest and true, are generally based on different accounting systems from those now in vogue. Further, it is hard to see how the profits or losses of a generation of men long in their graves have any logical connection with the value of a business today, or the results of a coal-gas business in the seventies pertinent to the value of a modern oil-gas plant. Again, value is by this method based on cost or loss, when, as I have said, the business may have been successful from the beginning. Finally, I confess to a mental astigmatism, if I am wrong, that makes me unable to see that plaintiff's property would have the greater value of a going concern so long as it was losing money and no additional going value in the periods of its greatest prosperity. The method should only be used in a comparatively new plant and then as an advisory indication only of the inevitable deficits that attend the early years of building a new plant to its normal capacity.

When we have the case of an old plant like this it seems to me that the only way the idea of the development expense method may be applied is by limiting the period of its operation to recent years. This leads logically to a comparative plant method. By that method the appraiser puts himself in the mental position of an intending buyer, with the alternative of buying the plant and business in question or of going into another community not served with gas and building up an equally profitable business; or, as Mr. Ryan frames the hypothetical alternative, assuming this city to be
1975 inadequately served by two or more competing companies and engaging in a competition with them that finally reproduces plaintiff's success. Mr. Ryan has worked this out with a fair degree of persuasiveness, basing his assumptions on the actual experience of the Metropolitan Light & Power Company here.

Mr. Ryan's various computations, which take into account the excess value of securities outstanding against this property over the appraisal of physical elements are, of course, open to Mr. Searl's objection that if they are valid methods they would show the value of the property as a whole, and that our elaborate appraisal already made was wasted effort. It is, I think, true that the investor in securities in the stock market is hardly a competent appraiser and takes his ideas of underlying values largely on the faith of the statements of others, including the company's balance sheets; his principal reliance is on the record of earnings as showing stability and promise for the future. If the value of outstanding securities were shown to be less than the appraisal of physical property in use it might show the absence of any going value. But when it appears to be more it is at least some indication as to the existence and approximate extent of the element of going value.

The same is true of the various conventional or rule-of-thumb methods, e. g., 20 per cent of physical value, one year's gross earnings, \$30 per consumer, and the like. I know of no adequately logical justification for these gauges of going value. (But see p. 103 below, Compensation for Management.) Their results are divergent and in many cases one or all may be patently inapplicable. The fact that they are, however, in one form or another, actually employed by buyers and sellers to check results otherwise reached, gives them claims to some consideration. Similar weight of a most general sort is to be given the percentages of going value allowances to physical appraisals shown in decided cases; I have given a summary of these in my Spring Valley report.

A careful reading of the testimony will show what has perhaps been made evident by this discussion. The figure we seek is not one that is susceptible of mathematical demonstration. But it is also made quite plain that the figure to be assigned to the element of going value is very large—to use Mr. Lowe's language, several millions of dollars. The figure must be reached by an honest effort of judgment of the tribunal charged with responsibility, based on all the indications of value and its amount that can be marshalled together. The result will, of course, be an approximation and in a constitutional case like this, a low approximation. It is, of course, obvious that such approximations by an effort of judgment where decision must be made are not unique. The real estate appraiser does it; so do juries and judges in many classes of cases. Perhaps the language of the master in the Denver case, hitherto quoted, is a fair way of stating how the job must be done.

Finally, I have borne in mind the attitude of the judge sitting in this court, who reviewed the Spring Valley report. There an allowance of \$3,400,000 for going value was reduced to \$1,400,000. While his reasons are not fully stated so as to guide me here, and the specific reason given is not here applicable, it shows that to another mind the master's allowance was so excessive as to be out of reason. Naturally I do not wish such a result to follow again. After due consideration of all the evidence and with a desire to reach a fair but conservative estimate, I allow \$1,500,000 in each of the years under examination to cover the additional value of the property appraised, viewed as a going concern.

Value of Franchise.

Defining the term franchise as a special privilege conferred by the State, which is not of common right among citizens generally, plaintiff may be said to have three franchises: the franchise to be a corporation, the franchise to collect tolls for public service, the privilege to which is appurtenant the right (itself a franchise) of eminent domain, and the franchise to occupy the public streets of the municipality. All these franchises are property, and within the protection of the constitution. No value is here claimed for the first or second types of franchise. The corporate franchise, it would

seem, would not have value beyond the cost of obtaining it, since it is open to all at all times. The value of the franchise to take tolls, as the sole justification for building the works, would seem to be embodied in the appraisal already effected. If the business were unregulated and the right exclusive there might be conceived to be an additional value, which, perhaps, would be reflected in the going value allowance.

For the third type of franchise, the right to occupy the streets of the city, the plaintiff claims a value of \$1,476,000. The right arises by virtue of section 19 of Article XI of the Constitution of California, which provided, prior to 1911, that in any city where there are no public works for the purpose any individual or corporation "shall have the privilege of using the public streets and thoroughfares thereof and of laying down pipes and conduits therein and connections therewith, so far as may be necessary for * * * supplying such city and its inhabitants either with gaslight or other illuminating light, or with fresh water * * * upon the condition that the municipal government shall have the right to regulate the charges thereof." The right thus acquired by the plaintiff upon accepting the offer in the Constitution by building its mains, is obviously a right of real property, an easement. It is alienable, hereditary where owned by an individual, and taxable. (*Stockton Gas & Electric Company v. San Joaquin County*, 148 Cal. 321; *People v. O'Brien*, 111 N. Y. 46; *Owensboro v. Cumberland Tel. & Tel. Co.*, 230 U. S. 65.) So long as the company fulfills its correlative obligations of public service it is irrevocable and, therefore, perpetual in its duration. (*Russell v. Sebastian*, 233 U. S. 195.) Like the franchise to collect tolls for service it is hard to conceive of its existence apart from the works to which it gives legal vitality; and it would appear that its characteristic of alienability would not be possible apart from the property as a whole to which it relates and that, correspondingly, a transfer of the works would carry the franchises. If not implied in law certainly no sale of the physical property at full value or at other than scrap value would in fact take place unless the franchises were transferred or unless like franchises were available to the buyer under the constitutional provision. It would seem to follow that the value of such franchises is embodied in the value of the physical property of the public utility.

The constitutional and statute law regarding franchises was modified by changes taking effect in 1911. Since that time the right to grant franchises of the class under discussion, the easement in the streets, has rested in the municipalities; while the franchise to do business and collect charges as a public utility depends upon the grant by the State Railroad Commission of a certificate of public convenience and necessity. (*Oro Electric Corporation v. R. R. Commission*, 169 Cal. 466.) This certificate, if granted, may be limited in scope in the commission's discretion, and be issued on terms and conditions. See Sec. 50c, Public Utilities Act of 1911.

By Section 52b of the act last mentioned no franchise of any character may be capitalized in excess of the amount, if any, paid by the granting authority as a consideration therefor.

The city of San Francisco, by an ordinance passed October 27, 1913 (Exhibit 96), granted an easement in the streets for gas or electric conduits to anyone, under conditions not of interest here as to opening pavements; providing also that in rate-fixing proceedings and in case of condemnation brought by the municipality no value should attach to the franchise; also, that the rights and privileges granted by the ordinance should not be transferred except by consent of the Board of Supervisors of the city.

We may consider now the question of value of plaintiff's franchise. The right to do business and to occupy the streets of San Francisco for all time, subject only to the usual exercise of the police power, is certainly of great importance to plaintiff, and as the legal basis for the operation of its property as a gas-works warrants us in giving that property the value we have assigned to it in the foregoing appraisal. Is the franchise worth something more, in and of itself, or by giving additional value to the physical property? Prior to 1911 it seems plain that any such special value did not exist. For an easement in the streets, such as plaintiff has, was open to anyone who chose to build a gas plant. What is open to all of a class has a money value to none of them. But counsel contends that the changes in the law have given plaintiff's franchise the value claimed. In examining these contentions we may examine the theory upon which plaintiff estimates a value for its right in the streets of \$1,476,000.

In this inquiry, as elsewhere in this study, it will aid our thinking to assume the attitude of the intending purchaser, with the alternative of competition. Plaintiff's theory is based upon the estimated cost of strips of land through the private property of the city, located in the middle of each block, so as to serve each lot from the rear. Based upon assessed values for taxation this cost is appraised at \$9,000,000, half of which is apportioned to plaintiff's gas department and half to the electric department. From this half is then deducted the value of the mileage of mains that would be saved by going through the blocks, the remainder being the sum claimed as franchise value. The appraisal is characterized as conservative. It is certainly unduly so. Purchases or condemnations are not effected on the assessor's figures for taxation; the actual cost would be at least one-half more. In addition must be reckoned the cost of acquisition by purchase or condemnation, which would be very large. The true cost of such a right-of-way would probably be several times the figure named, and so large that counsel would probably not be disposed to offer it. The difficulties of construction, when one considers the buildings existing over the hypothetical right-of-way, are sufficiently obvious. I may also confess doubt, without, however, giving the matter mature consideration, whether plaintiff could cross the streets between the blocks under the authority of *Colegrove Water Co. v. Hollywood*, 151 Cal. 425.

Plaintiff's theory must be and is that only by this rather fantastic process may the intending purchaser during the years in question obtain a franchise equal in desirability to the one plaintiff possesses. But would not his reasonable alternative be the easement and the

seem, would not have value beyond the cost of obtaining it, since it is open to all at all times. The value of the franchise to take tolls, as the sole justification for building the works, would seem to be embodied in the appraisal already effected. If the business were unregulated and the right exclusive there might be conceived to be an additional value, which, perhaps, would be reflected in the going value allowance.

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Plaintiff's theory must be and is that only by this rather fantastic process may the intending purchaser during the years in question obtain a franchise equal in desirability to the one plaintiff possesses. But would not his reasonable alternative be the easement and the

franchise to do business under the laws in force? I see no substantial difference in favor of plaintiff's franchises. So far as my attention has been directed to the law, the old and new franchises are, equally, perpetual, irrevocable and conferred without cost. The requirement under the new laws that the franchises shall not be capitalized or valued confers no value by comparison on plaintiff's franchise, for it had none before. The requirement now that the commission must issue a certificate of public convenience and necessity bears rather on plaintiff's franchise to operate, for which a value is not here claimed; but even in that regard the requirement tends rather to protect plaintiff from loss of its capital through new competition than to add value to it. The only objection I can see to the easement given by the city ordinance is the requirement that it cannot be transferred without the consent of the Supervisors, a point not discussed in the argument. We may assume that in the event of sale, the Supervisors would follow the action of the State Railroad Commission, whose approval is necessary to any sale. If the chance that they would not approve affords greater comparative desirability to the older franchise, I know of no way to express this slight advantage in money value.

I conclude that plaintiff's franchise has no separate or additional value beyond the sum of values of its physical property, together with its going value already recognized in the foregoing appraisal.

1980 What has been said concerning franchise values applies to the situation here shown by the evidence. If plaintiff's franchise were exclusive, if the law now conferred rights for a limited term, or burdened with payments to the municipality, in such differing circumstances there might be something to consider as to an additional value.

I lay no stress on the fact that plaintiff's franchise cost nothing. If it had cost a great deal, and an equally desirable franchise could be now obtained for nothing, it would not now be valued. If the city had given this plaintiff its necessary lands, those lands would be valued for a return. But if all utilities were as a settled policy given like benefits, no such gifts would be included in the rating base. The absence of value under both the old and the new law is due to the fact that the rights are obtainable by all on substantially the same terms.

I have preferred to discuss this question without reference to decided cases because, frankly, I do not think the cases which have dealt with the value of franchises as an isolated question are likely to be of much assistance. It is only with the development of the law regarding valuation of public utility properties as a whole in litigation like this that we have begun to understand the principles of valuation. I have read the cases cited. Sometimes the valuation is of an exclusive privilege; sometimes it covers what we have called going value. Counsel refers to my judicial knowledge that franchises like this one are assessed at large sums and taxed specially; and I will assume this is so without being actually aware of it. I should say that such assessment and taxation is wrong, and

yet such wrong may be settled by decision beyond repair. Sometimes the court may refer to the franchise as of "great value," and a "principal basis of credit." (Owensboro v. Cumberland Co., 230 U. S. 70.) Justice Lurton ruled that it could not be taken by municipal action, and I think meant by the words quoted that it was the legal basis maintaining the value of the company's plant and business, which would be destroyed or reduced to scrap value if the right to operate were taken away. That does not imply an additional value in the franchise alone.

In *Monongahela Navigation Co. v. United States*, 148 U. S. 312, the government sought to condemn the rights of the company in a river where it had theretofore taken tolls for passing through locks and dams that made navigation possible, at the value of the lock and dam-structures alone. The Supreme Court held this could not be done without paying also for the franchise. It does not appear whether the tolls had been fixed by the state or to what extent the total net earnings afforded a return beyond interest and profit on the value of the structures alone. The implications of the decision are that there was or would be such a surplus. To the extent that the decision recognizes the value of such a surplus in the past and present, it is a recognition of what I prefer to call "going value;" to the extent that it recognizes potential increase of such surplus in the future, it recognizes not only the element of going value, here in an unregulated business, but also the value of an exclusive franchist. The underlying principle of the decision that "the value is not determined by the mere cost of construction, but more by what the completed structure brings in the way of earnings to its owner" (p. 328), seems to be the rule of what the traffic will bear. That rule, properly understood, may be the true economic law, but it must be recognized that current decisions of controlling authority do not stand on that basis. The case is no authority for allowing an additional value here.

Neither is *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, in point here. Prior to 1884 seven gas companies operated in New York city under franchises to use the streets granted without cost. In that year a statute allowing consolidation of corporations was enacted, providing for an agreement among the various boards of directors embracing the proposed capital and the number of its shares, the capital not to be more "than the fair aggregate value of the property, franchises and rights of the several companies to be consolidated" (pp. 42-3). Six companies consolidated in November, 1884, under the act. In the directors' agreement the value of all the franchises was fixed at \$7,781,000 (p. 43), and stock of the new company was issued in exchange for the old stock, covering the full values agreed upon, including the value of the franchises. Prior to the consolidation the companies had been free from state regulation of rates and had earned and paid large dividends (p. 45). A legislative committee, appointed in 1885 to investigate the consolidation, reported that "the valuation of \$7,781,000 for the franchises was not more than their fair aggregate value." They said: "A law

was on the statute books that virtually prohibited the laying
 1982 of any more gas pipes in the streets. The gas companies had
 an agreement among themselves fixing the price of gas at a
 figure that paid these dividends. The people were paying this price,
 as they had in the past, without objection or protest. This price may
 have been too high and the dividends were excessive, but they were
 not illegal, and the valuation of the franchises computed upon these
 dividends and that state of facts cannot be called a violation of a law
 that expressly authorized it to be done, unless such valuation was too
 high " (p. 46). The lower court and the Supreme Court agreed that
 where a law thus existed providing for a valuation of franchises
 where the valuation had been made and always recognized as valid,
 both by state authorities and the public, and where stock had been
 issued covering that value "and had been largely dealt in for more
 than twenty years past on the basis of the validity of the valuation
 and of the stock issued by the company," the valuation of the
 franchises should be upheld and allowed in the capital entitled to
 return in a rate-fixing proceeding (p. 47). The Supreme Court said,
 however, that the case was founded "on its own peculiar facts, and
 the decision thereon can form no precedent in regard to the valuation
 of franchises generally" (p. 48).

I think this statement of the Consolidated Gas case is sufficient,
 without more, to show that it forms no precedent to govern the facts
 of the case at bar.

Summary—Value of Property, Used and Useful—San Francisco Gas Department.

Our appraisal of the property used and useful in the produc-
 tion and distribution of gas in San Francisco is now complete and
 may be summarized as follows:

Ante.	1913-14.	1914-15.	1915-16.
14—Lands	\$900,816.92	\$900,816.92	\$931,748.71
18—Structures	11,275,618.00	11,284,955.00	11,683,925.00
80—Working capital.....	300,000.00	300,000.00	300,000.00
87—Going value.....	1,500,000.00	1,500,000.00	1,500,000.00
Total value.....	\$13,976,434.92	\$13,985,771.92	\$14,415,673.71

I shall later discuss the purchase cost and book costs of this
 property; but, for the present, the values thus summarized
 1983 will be the capital upon which a fair return is to be computed.

When we have determined the operating and maintenance
 costs, taxes, allowances to reserves for depreciation, and for fire
 hazards and casualties, we will have, with the return on capital,
 computed at the minimum reasonable rate, the total cost of produc-
 tion and a reasonable gross revenue for the gas supplied.

Compensation for Management.

Before taking up the operating costs, taxes and reserves, it is
 necessary to dispose of the plaintiff's claim for inclusion in the

charges upon revenue of what counsel calls compensation for management. It is not an expenditure, like executive salaries, but an added profit.

Mr. Grunsky's exposition of the theory (Tr., 2186-92), is short and interesting. I will state it briefly and comment on it as I go. The owner's return should include more than the bare interest rate for the use of money; it should include something as his profit and something for risk. With this I agree and shall include it in my determination of the fair rate of return. He says the utility owner should share in the general prosperity of the community which he has done much to create. This is true, and is recognized in the method of valuation hitherto employed, viz., appraising lands at present market value, and structures on the basis of present replacement costs. The Supreme Court evidently believes the principle is so recognized in an appraisal on such basis. (Minnesota Rate Cases, 230 U. S. 455.) Mr. Grunsky finally concludes that the owner should be rewarded for the stability and efficiency of the organization which serves the public needs and for the success of its operation (Tr., p. 188). This seems to be included in my allowance for going value. Indeed, Mr. Grunsky seems to imply that where the problem has been handled in the manner pursued in this report, the item of compensation for management has been taken care of. He says, "When there is included in the rate base, thus established, an allowance for going value, the interest return allowed and earned on this going value, together with earnings to cover the excess of the return rate over the ordinary interest rate, is the owner's compensation for hazards and for management, and may also cover some participation in the prosperity and increasing values of the property in the community which is served by the utility." (Tr., 2187.)

Mr. Grunsky's only point of divergence from the procedure 1984 embodied in this report seems to be that he does not favor the inclusion of going value in capital, but prefers the equivalent alternative of an allowance in income. His idea is that a percentage of gross income be allowed, income being, in his view, the best index of the value of the going business. His testimony is an interesting exposition of what I have characterized as one of the rule-of-thumb methods (ante, p. 94). He does not state what percentage or amount he would allow.

Professor Fairchild testifies to similar effect (Tr., 2561). Mr. Ryan (Tr. 2470-2496) also testifies on the same lines and the same comment is applicable. When he comes to the translating of his theories into figures, however, he does so on a somewhat different and more restricted basis, namely, the excess value of the services of plaintiff's officers and directors over the salaries paid them. I will not describe the method of his calculation here; he reaches these amounts to be added to costs: 1913-14, \$151,201; 1914-15, \$162,319; 1915-16, \$196,477. The city's apt rejoinder to this contention is that if the officers and directors are worth more than they are paid, their salaries should be raised; that only on this theory can there be an addition to costs; that the surplus value of executive services is no reason why stockholders should receive increased dividends. In

other words, the logical result of Mr. Ryan's calculation, assuming its merit, is to point, not to a cost but to a capital value, the value of an efficient organization. As I have said, this is one of the considerations which underly the idea of going value. To allow it here would be a duplication. To my mind all that the testimony can possibly be used for is to argue that my allowance for going value is not only conservative but too small.

Annual Allowances to Reserves.

Plaintiff claims that the following allowances should be made to fire, casualty and automobile insurance reserves as part of the reasonable costs of production (Exhibits 42, 30, 33) :

	1913-14.	1914-15.	1915-16.
Fire	\$44,946.55	\$44,964.80	\$41,994.16
Casualty	29,414.01	19,965.38	19,103.57
Automobile	4,173.35	4,670.43	5,467.77

These sums do not represent actual expenditures, but the premiums that plaintiff would have paid to insurance carriers if it had bought insurance policies. It has, however, felt strong enough to carry its own insurance and has set up reserves for that purpose.

The city's claims as to the reasonable requirements for these reserves are based in part on the actual practice of the company in determining the amounts to be carried to reserve and in part on the actual loss experience of the company.

Reserves are set aside by plaintiff to cover its whole system. An apportionment is therefore necessary to determine the amount applicable to the San Francisco gas department. I give below the city's apportionment, which is based on the ratio of charges against the fund; I do not recall a similar apportionment by any of plaintiff's witnesses. (Tr., 3124, 3127.)

Actual Reserves—Fire.

	System.	Apportioned S. F. Gas.
1913.....	\$15,000	\$5,300.70
1914.....	15,000	3,570.00
1915.....	12,000	240.48
1916.....	24,000	3,826.07

Actual Reserves—Casualty.

	System.	Apportioned S. F. Gas.
April 1, 1913—June 30, 1913.....	\$73,996.54	\$4,601.21
July 1, 1913—June 30, 1914.....	66,000.00	11,609.40
July 1, 1914—June 30, 1915.....	101,500.00	7,097.39
July 1, 1915—June 30, 1916.....	96,000.00	11,433.60

The loss experience of the company for a period of years, fire and casualty, has been as follows (Tr., 3124, 3126):

Year.	Fire.	Year.	Casualty.
1909.....	\$9,660.02	1909.....	\$19,929.65
1910.....	.....	1910.....	8,776.90
1911.....	3,207.47	1911 (11 mos.)...	1,990.53
1912.....	2,593.87	1912.....	.....
1913.....	3,262.69	1913 (3 mos.)....	2,039.26
1914.....	2,282.22	1913-14.....	15,558.57
1915.....	480.63	1914-15.....	5,446.96
1916.....	1,197.53	1915-16.....	10,527.95
8 years.....	\$22,684.43	7½ years.....	\$64,269.82
Yearly average....	\$2,835.00	Yearly average....	8,569.00

1986 Mr. Ellis, for the city, concludes that considering both the company's allotments to reserve, as representing its own judgment of the necessities of the case, and the actual loss history, an allowance to fire insurance reserve of \$10,000 each year under examination, and to casualty insurance reserve of \$15,000 each year, will be just. The city allows nothing for automobile insurance because the company has neither insured nor created a reserve for that purpose, the losses accruing having been charged into fire or casualty reserves.

To resolve the conflict between the two positions has not been easy and I have been of two minds as to the just solution. Both are open to criticism.

If the plaintiff had, in fact, carried insurance with companies in that business and had paid the sums named as premiums the city could hardly offer tenable objection to their inclusion. Plaintiff's counsel argues that they should here be allowed as representing the market value of the risk the company has assumed. The argument is more plausible than sound. Plaintiff is not in the business of selling insurance and does not meet the expenses of acquisition—commissions, salaries, rent, etc. The amount to 40 per cent of the premiums in the case of fire and casualty insurance, and 45 per cent in the case of automobile insurance. But I think a reasonable argument could be made for the allowance of reserves to the extent of the remaining 60 per cent and 55 per cent, respectively. For the carrying of its own risks was in pursuance of a motive entirely reasonable; obviously, the saving of the 40 per cent expense and the making of any profit that might be contained in the 60 per cent remaining. Since the great saving in expense is for the advantage of the consumer, the company should have any profit that might accrue from the favorable outcome of the law of probabilities, just as it should stand the very considerable losses if the risk turned out to its disadvantage. On this basis the reserve allowances for the respective years would be: Fire, \$26,946.55, \$26,978.88 and \$25,196.49 (Tr. 3126); Casualty, \$17,648.41, \$11,979.23 and \$11,642.14; Automobile, \$2,295.34, \$2,568.74, \$3,007.27.

On the other hand, the criticism to be made of the city's estimate is that it gives too much importance to the company's loss experience during seven or eight years. On that reasoning, in view of the fact that I have carried insurance for fifteen years without a dollar's loss by fire, I should now go uninsured. In other words, the experience has been too narrow, and insufficient account would apparently be taken of the danger of catastrophe. Mr. Leslie, Secretary-Actuary of the State Compensation Fund, said (Tr., 3011-12): "I am very reluctant to admit that any single company could be absolutely certain of its experience to the extent that it could say that it would or would not have a definite loss ratio. * * * Catastrophe is the biggest element. The ordinary small losses, minor accidents, and accidents involving serious injury to only one person, are things that can be measured more certainly than possible catastrophes. Catastrophes occur very rarely, but when they do occur, so far as one particular industry is concerned, or one particular employer is concerned, they are very, very costly."

But it is apparent that this criticism of the city's allowance applies with greater force to the smaller allowance that the company made to the reserve accounts. The evidence shows that the reserve set up each year was placed at approximately the sum of the past year's losses. Counsel calls it a "working reserve." It is the replacement method of accounting depreciation applied to insurance reserves. There are cases where this method will be proper in the case of depreciation, i. e., where experience has shown substantial uniformity of replacements; but while abandonment by depreciation is sure to occur, insurance risks may not result in losses at all, and, on the other hand, do not occur with uniformity. The method, however, is not out of reason. It was one which the company's officers had a right to choose, and presumably chose with reasonably good judgment. It seems to me this court would be open to criticism if it rejected an allowance more liberal than that carried by plaintiff itself. Accordingly I adopt Mr. Ellis's estimates.

Summarizing the total allowances to be made to reserves, and bringing forward the depreciation allowances from page 79, ante, we have:

Annual Allowances to Reserves.

	1913-14.	1914-15.	1915-16.
Depreciation	\$348,853	\$372,680	\$380,519
Fire Insurance.....	10,000	10,000	10,000
Casualty Insurance.....	15,000	15,000	15,000
Total Reserves.....	\$373,853	\$397,680	\$405,519

1988 Expenditures for Operation, Maintenance and Taxes.

These expenditures will cover the rest of the costs of production, excepting the owner's return. There is no dispute that the amounts

claimed by plaintiff under this head were in fact spent and were fair. The questions raised are matters of accounting. Some charges are sought to be eliminated as already covered in the appraisal of capital by replacement methods; some as chargeable to reserves; some as chargeable to surplus, that is, not properly costs of making and distributing gas at all; some as chargeable to other departments of plaintiff's system; and there is a substantial difference as to the basis upon which costs chargeable to the entire system, like the salaries of general officers, should be apportioned to the gas department in San Francisco. There is a great deal of detailed testimony and of statistical exhibits. I shall be able to touch only lightly on the questions presented.

The expense statements of each party are conveniently collated in plaintiff's Exhibit 108 (and see table 6 of the city's argument, at page 652), as follows:

	1913-14.	1914-15.	1915-16.
Plaintiff	\$2,122,174.46	\$2,264,756.97	\$2,269,304.43
Defendant	2,005,322.26	2,138,395.98	2,181,020.02
Difference	\$116,852.20	\$126,360.99	\$88,284.41

Exhibits 85, 86 and 87 are detailed statements showing the city's objections to the plaintiff's accounting of expenditures. I have used them in connection with the testimony as the basis of my work, taking up each item in the mass of detail. It is pleasant to record my appreciation of the ability and the fair attitude of the company's general auditor, Mr. Bridges, and of the city's accountant, Mr. Grimshaw.

My results in detail are shown in three appendixes to this report. Appendix I shows my allowance or disallowance of the city's deductions classified under the headings of plaintiff's Exhibit 108. There follows a summary showing the plaintiff's claimed operating expenses in the three years, my deductions therefrom and the resulting allowed operating expense. Appendix II is concerned with one of the subheads of Appendix I, General and Administrative Expense;

it shows my disposition of the city's deductions under the 1989 classifications shown in Exhibits 85, 86 and 87. Appendix

III shows the computations to determine the allowed General and Administrative Expense, and the proper apportionment thereof to the San Francisco gas department of plaintiff. These appendixes will, I think, be readily intelligible to the parties, but not to the reviewing court except in connection with the detail in the testimony. What follows is only a general reference to certain problems of importance and my disposition of them.

It seems not disputed that plaintiff's accounting system was governed during the period here in controversy by the rules embodied in the Uniform Classification of Accounts for Gas Corporations of the Railroad Commission of California, effective in January, 1913. The questions at issue are therefore questions of interpretation and proper application.

The accounting of furniture and tools is an example of such a

question, though the amounts involved are not enough to be of critical importance. The company's auditor says their plan has been to consider such items of capital as a fairly constant total sum, and so to charge new purchases at once to operating expense. (Tr., 3552, 3574.) This avoids the necessity of elaborate records of equipment, much of it portable, and also avoids the keeping of depreciation accounts for such property. There is much to be said for this plan, and I followed it in the Spring Valley report. But the Commission's classification seems to require a charge to fixed capital of property having an expectation of life in service of more than one year, exception being made of hand tools or other portable apparatus liable to be lost or stolen; but even here the test of the excepted class seems to be the possibility of accurate recordation. It is not easy to pass upon an audit along these lines; but, in general, I think I have followed the city's auditor.

The headings, payments to banks and trust companies, financial expense, financial advertising and the like, have to do with expenditures of considerable sums which have been eliminated as not operating expenses. They include, for example, trustees' fees under bond mortgages, payments to banks for cashing coupons, advertising the financial condition of the company and the desirability of its securities for investment purposes. Mr. Bridges defends the charging of trustees' fees to expense rather than to bond discount and expense, on the ground that the latter account in the official classification 1990 has to do only with original discount and expense and not with the expense that recurs during the later life of the bonds. I do not so read the Commission's rule. In general, all expense connected with the obtaining of capital is treated by me as no part of the cost of manufacture and distribution of gas. It is not assumed that the owner has the necessary money at all times ready, for that would be contrary to the established facts of corporate existence in industry, but the effect is the same as if we made that assumption. In other words, if capital has to be obtained at an expense, that expense is considered properly covered in the rate of return allowed on capital.

A distinction has been made between donations to charities and subscriptions to commercial associations, the former being disallowed and the latter allowed. This may seem curious at first thought, since it seems to deny recognition of the greater merit involved in assisting charity. But the question is whether the donation shall be charged to operating expense, borne indirectly by the consumers of gas, or to surplus, and thus be borne by the plaintiff's stockholders. Though charitable donations are here defended by counsel as properly charged in operating expense on the ground that they represent a good business policy, I prefer to believe that they are made from the more worthy motive. Donations to merchants' associations, popular festivals and chambers of commerce are made for business advantage of one kind or another; their sole ultimate aim is to increase revenues.

Akin to the latter class is the proportion allotted to the San Francisco gas department of the plaintiff's subscription to the Panama-Pacific Industrial Exposition, held here in 1915. This I have al-

lowed in operating expenses. In form it was a purchase of shares of stock in the Exposition corporation; but in purpose and effect, and in everyone's undersanding, it was a contribution to a public enterprise aimed at commercial advantage. Plaintiff's benefit from the presence of great numbers of visitors was apparent in increased revenues. In addition, irrespective of whether the subscription involved a return equal to the outlay during the particular years, such an enterprise tends to increase the permanent population. In the Spring Valley Water Company's case, the city's claim of deduction was given effect, but the circumstances were different. In the first place, the water company conceded the point, so that it was not passed on; in the second place, that company sold water chiefly on flat rates, so that increased consumption involved loss rather than gain, as in the case of the gas company, whose product was metered.

The question of apportionment was involved in a majority of the items. If an expenditure concerned a hydro-electric project in the mountains, a piece of land in the country, or a lawsuit concerning a water right, there might be some difficulty in saying that the San Francisco electric rate should not share the cost with the rate given the farmer; but it is hard to see why it should enter into the cost of gas. So litigation in this court regarding the rate fixed for gas in Sacramento, even though successful, should be charged to the Sacramento district and not enter the San Francisco costs through an apportionment.

The cost of litigation attending the cases at bar in their initial stages have been eliminated for another reason, viz., that the constitutionality of the ordinances fixing rates cannot be affected by costs incurred in fighting them. And yet there is no question these suits were brought in good faith; indeed, the management would have been derelict to its stockholders in not bringing them, for, as is shown by the fact that this court awarded temporary injunctions, it seemed probable that the rates fixed were confiscatory. The single item of cost of keeping the record of excess collections over the rates fixed by the municipality has been \$24,000 in each of the last two years herein involved. I shall refer to such costs as these again in connection with my discussion of the fair rate of return.

There remains to be mentioned the basis upon which General and Administrative Expenses shall be apportioned as between the San Francisco gas department and all its other departments. The company adopts the ratio of the number of consumers in each department. The city adopts the ratio of gross revenue as its basis of apportionment. There is considerable testimony and much intricate computation. It is enough that the city's basis seems equally reasonable with that of plaintiff; but I can go further, for it seems to me affirmatively a more natural and just basis of division.

I accordingly find that the reasonable costs of plaintiff for operation, maintenance and taxes for the years in question were:

1913-14.....	\$2,031,926.11
1914-15.....	2,168,931.37
1915-16.....	2,193,603.49

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Fair Rate of Return.

In pursuing the rule that a public service company is entitled under the Fourteenth Amendment to a fair return on the fair present value of its property used and useful in the public service, we have found what property was used and useful and its fair present value. As part of its fair return the necessary reasonable costs of operation, maintenance and taxes have been determined, and also the required amounts for reserves. There is thus left for determination the net return, the rate at which the capital should earn.

The plaintiff urges that this rate should be fixed at 8 per cent. The city contends that a net earning of 6 per cent is not confiscatory.

Considering the character of the business and the time and place of its operation here in question, considering also the manner in which numerous questions attending the appraisal of property and the audit of expenses have been resolved, and considering the evidence and the arguments before me, I am entirely clear, and I find that the minimum fair return that plaintiff was entitled to earn was seven per cent a year.

I may anticipate the city's objection to such a finding, which was urged, indeed, upon the argument, that the court's function is not to determine what is fair between the utility and the consumer, that being in the city's view the exclusive function of the rate-making body, but rather to determine the lowest non-confiscatory rate. It seems to me the two contrasted statements of function are identical in meaning, and that, therefore, the argument is a form of words without substance. It cannot be denied, however, that there is ample precedent for the city's position in the language of decisions of the highest authority. There has, however, been a progress by well-defined stages from practical non-interference by the court with the rate of return to be allowed, toward the stating of a fair rate, and a firmer stating of the court's duty to control legislative discretion. It would be an interesting and valuable study to set forth this history by detailed reference to decisions, but I shall content myself with a survey of a more general character.

In the earlier cases touching the constitutionality of legislation fixing rates for public utilities, the court emphasized so strongly the primary responsibility and consequent range of discretion of the legislative body that it refused to set aside the rates fixed if any compensation, however small, was shown. Thus in *C. & N. W. Ry.*

Co. v. Dey, 35 Fed. 866, 879, decided in 1888, Justice Brewer 1993 said:

"The rule, therefore, to be laid down is this: That where the proposed rates will give some compensation, however small, to the owners of the railroad property, the courts have no power to interfere. Appeal must then be made to the legislature and the people. * * * Compensation implies three things: Payment of cost of service, interest on bonds, and then some dividend. * * * While by reducing the rates, the value of the stockholders' property may be reduced, in

that less dividends are possible,—and that power of the legislature over property is conceded,—yet, if the rates are so reduced that no dividends are possible, and especially if they are such that the interest on the mortgage debt is not earned, then the enforcement of the rates means either confiscation, or compelling, in the language of the supreme court, the corporation to carry persons or property without reward. * * * No legislature can directly or indirectly lay its withering or destroying hand on a single dollar invested in the legitimate business of transportation.”

We may pass by the obvious contradictions in the language of the quotation. The value of property is the value of its uses. The Fourteenth Amendment provides for due process of law in case of taking by the state, and due process implies just compensation. If, then, a court will not interfere, provided, say, one-tenth of the just compensation for use of a railroad by the public is allowed, it is abdicating its solemn duty to enforce the Constitution as to the remaining nine-tenths of the value of that use, and permitting, therefore, a confiscation of nine-tenths of the money invested in capital assets of a business declared legitimate.

San Diego Water Co. v. San Diego, 118 Cal. 556, decided in 1897, marks approximately the time when the courts began to realize their responsibility to face and determine the issue of just compensation. The opinion of the court was written by Justice Van Fleet, now judge of this court, concurred in by two justices; but there were also three concurring opinions. The latter followed the formulae of the early cases. Thus Justice Garoutte said (p. 581):

“This leaves a profit of \$25,000 upon the investment. To be sure, it is small * * * not enough. * * * Those are matters passed upon by the city in the exercise of a discretion granted by the constitution, and its decision as to the reasonableness of the 1894 amount of revenue to be derived by the company from the rates is conclusive upon the courts. While this sum is not enough upon this character of investment, still it is three and one-half per cent, and such return is a substantial profit. We mean it is so substantial that a court of equity, in view of the law of the land, cannot say that the rates are so unreasonable as to be confiscatory in character, and thus violative of any principle of constitutional law.” (Citing the Dey case.)

Justice Harrison, while disclaiming any authority in the judiciary to consider the reasonableness of the compensation allowed by the rates, referred to the fact that 3 per cent was more than the current interest on government bonds.

In the majority opinion Judge Van Fleet said (p. 571):

“But it is contended that the power of the court is at most to inquire whether some reward will be provided by the rates fixed and that if some reward, however small, is so provided, the court cannot interfere. We have been referred to dicta in some of the cases which do support that contention; but we are unable to agree with that

conclusion. It is an elementary doctrine of constitutional law that the question of just compensation is a judicial question to be determined in the ordinary course of judicial proceedings; and construing article XIV of our constitution with section 14 of article I (as we think we are bound to do), we find no difficulty in holding that whenever the rates fixed by the council are grossly and palpably insufficient to furnish such a revenue as will afford just compensation within the rules above declared, redress may be had in the courts. Of course, every slight or conjectural deficiency will not justify an appeal to the courts; nor, if the question be doubtful, will the court, in the absence of fraud or other special ground of equitable interference, substitute its judgment for that of the municipal body. But whenever it is *clear and beyond question* that the revenue which the company can possibly receive under the rates fixed will be wholly insufficient to allow it the compensation to which it is legally entitled, it is the duty of the court to declare the ordinance void." (Emphasis mine.)

It is submitted that this is a clear and accurate statement of the court's duty. And Chief Justice Beatty, concurring in this regard, said, at page 588:

1995 "In fixing water rates, it is the duty of the city council to provide for a just and reasonable compensation to the water company. Anything short of that is simple confiscation, and is not only a violation of constitutional rights, but is an extremely short-sighted policy."

Such forthright common sense is in refreshing contrast with the barren legalism of the minority opinions.

The early decisions, which, by referring public utilities to the ballot-box or by necessary consequence to a receivership, show a plain abdication of the court's duty to uphold the Constitution, are fortunately no longer met with in current decisions. But there ensued a statement of principles of guidance to a court which became fairly prevalent and is still current. This is the doctrine so stoutly maintained by the able counsel for the city in this and other cases before me, namely, that a fair rate of return is one thing, the rate which a rate-fixing body would adopt, and that the court must find another and lower rate, one that just escapes being called a "confiscatory" rate. The judicial problem, to be sure, is to determine the limit of confiscation, and just avoid it. I am objecting to the use of the term "confiscatory" in the endeavor to determine the fair rate, solely because in practical effect it puts hobbles on the free march of mental processes. The average lawyer or judge, who in the humble financial dealings of his kind may be paying 6 per cent on a mortgage or be receiving 5 per cent or 6 per cent on some well-secured bond or stock, will inevitably balk at holding that a 6 per cent return is confiscatory of capital, even though the evidence may be clear to his mind that the lowest fair rate for the utility before him would be 7 per cent.

The city attorney's point of view is supported in some degree by two decisions of this court. It is, of course, a delicate matter to offer criticism in such circumstances; but I take it one may acknowledge the binding force of a decision, and at the same time assist in the development of true doctrine by suggesting possible weakness in the reasoning by which the result is reached.

In *Spring Valley Waterworks v. San Francisco*, 124 Fed. 574 (1903), on motion for a preliminary injunction, the court cited *Monongahela Navigation Co. v. U. S.*, 148 U. S. 312, and *R. R. Co. v. Henry*, 8 Nev. 170, on the meaning of "just compensation," and said (p. 602): "Neither is it in the power of the court to diminish the measurement of just compensation in any degree. Just compensation is an absolute fact, and, when ascertained, must be so regarded in any judgment the court may render." But at page 598 the court said (emphasis mine): "The *weight* of evidence is *clearly* in favor of a rate of not less than 6 per cent per annum"; and at page 599: "But in the present inquiry all doubts as to facts in controversy should be resolved in favor of the defendants."

* * * In view, therefore, of all the circumstances, the court is of the opinion that the complainant is entitled to receive at least 5 per cent * * *." If 6 per cent is clearly fair, as stated, then 5 per cent is obviously less than fair, and just compensation is diminished by one-sixth in violation of the principle first stated. I am convinced, however, that the applicability of this criticism arises from an inadvertence of language in stating that the weight of evidence was clear in favor of 6 per cent. The evidence consisted of affidavits of bankers, presumably merely containing opinions as to rate, without elaborate justification in detail. The court says four of these fixed 7 per cent as the minimum fair return, five fixed 6 per cent and one, a rate between 4 per cent and 5 per cent. Evidently the learned judge had in mind in the phrase quoted the volume of evidence and the number of witnesses, and, nevertheless, had doubt in view of the opinion favoring a lower rate. The result, however, has been that the opinion has been interpreted as announcing a canon of judicial reasoning that, though the judge may be clear that the evidence manifestly shows that a given rate is the minimum fair rate of return, he must attune his mind at a lower note, say one per cent less, in order to maintain a correct division of authority between court and legislature.

However, in *Spring Valley Water Co. v. San Francisco*, 252 Fed. 987, a very late case in this court decided by a visiting judge since the submission of this case, the city's contention is fully sustained. The master had found that 7 per cent was the minimum fair return shown by the evidence to be applicable. I quote enough to indicate the manner of approach to the problem:

"The master found that the plaintiff was entitled to a return of 7 per cent on its invested capital during the several years in controversy here. If this is to be deemed a mere finding that such a rate of return was fair and reasonable as between the company and the water consumers, I have no comment or criticism to make. If,

on the other hand, it is to be deemed a finding or conclusion
 1997 that any less rate of return was confiscatory and violative of
 the Constitution of the United States, I must dissent there-
 from. This court has no jurisdiction to review the action of the
 board of supervisors in the matter of fixing rates, and no jurisdiction
 to enjoin the enforcement of rates which are lower than the court
 itself would fix after full investigation. Any such attempt on the
 part of the court would be usurpation in its worse form. In *Spring
 Valley Water Works v. San Francisco*, 82 Cal. 286, the court said:
 * * *

“But the courts cannot, after the board has fully and fairly
 investigated and acted, by fixing what it believed to be reasonable
 rates, step in and say its action shall be set aside and nullified be-
 cause the courts, upon a similar investigation, have come to a differ-
 ent conclusion as to the reasonableness of the rates fixed. There
 must be actual fraud in fixing the rates, or they must be so palpably
 and grossly unreasonable and unjust as to amount to the same
 thing.’”

The opinion then quotes *San Diego Land Co. v. National City*,
 174 U. S. 750, and continues:

“Cases may doubtless be found in which trial courts have found
 that public service corporations were entitled to a return of seven or
 even as high as eight per cent on the capital invested in certain
 enterprises; but I have found no case where the court has held that
 a less rate of return than 7 per cent is confiscatory or violative of
 the Constitution. A return of 6 per cent was approved by the
 Supreme Court in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19,
 and I think the consensus of opinion favors the view that such a
 return is not confiscatory or violative of the Constitution.”

The opinion then quotes *Stanislaus County v. San Joaquin &
 K. C. C. Co.*, 192 U. S. 201, and continues:

“The reasonableness of a return depends in a measure on local
 conditions, on the risks assumed, and other considerations. But it
 is a matter of common knowledge that interest rates vary almost as
 much in the same locality at different times as they do in different
 localities at the same time and in an enterprise of this magnitude
 the question of locality, while entitled to consideration, is not
 1998 controlling. At least the Supreme Court did not so consider
 it in the case just cited arising in the same state. For these
 reasons I am of opinion that a return as high as 6 per cent on the
 invested capital or value of property devoted to the service of the
 public is not confiscatory, and violates no constitutional right of the
 plaintiff.”

The decision on this and other points was not critical, since it
 went for the plaintiff anyway. The following criticisms seem to me
 obvious: First, when the judge said he had no criticism of the

finding that 7 per cent was "fair and reasonable as between the company and the water consumers," his task was at an end. A rate less than that must be unfair. The doctrine seems to be that the minimum non-confiscatory rate must be something, say one per cent, less than the fair rate. Second, the opinion suggests a doubt as to whether the evidence was considered; at least its chief stress is upon judicial precedent as to rates deemed sufficient. The error is thus one of treating what is essentially a matter of fact (see 124 Fed. sup. cit.), as if it were a matter of law. Judicial precedents in such a matter are useful if properly estimated, but useful only to show how facts are to be handled, i. e., as aids to reasoning, not as decisions of fact elsewhere applicable.

I feel the more free to object to reasoning of which this is a type because this Court in other decisions has stated the rule correctly. In *Spring Valley Water Co. v. San Francisco*, 165 Fed. 677 (1908), this Court referred to the growth of doctrine from the time when the courts were held bound by the legislative determination, through the period when they ventured to say the legislature must allow at least some return, however small (e. g., the *Dey* case), and then commented on the latter class thus:

"These authorities lend support to the position taken by defendants that, inasmuch as the question of rates has been left to the board of supervisors, its decision, like the decision of any other judicial tribunal, however inferior, upon a question of fact, is conclusive; and unless there has been fraud in fixing the rates, or the rates are so palpably and grossly unreasonable as to be fraudulent in effect, the Court is powerless to set them aside. The only logical deduction from this doctrine was that legislative bodies might, under the guise of regulation, reduce the net earnings to the minimum, and thus, while not taking their physical property, deprive them for the most part of that which constitutes its value; that is, of its use, its profits and its earnings. *This doctrine later gave way* to the principle that, while the legislature has the power to prescribe the charge, the reasonableness or unreasonableness of such a charge is a question for the courts; and if, in the exercise of their legal discretion, the courts determine that a charge so fixed is unreasonable, that determination must prevail over any presumption in favor of the legislative act (citations). * * * To say that a body of rates which affords some compensation, but something less than a reasonable compensation, is not confiscatory, is simply to say that the Constitution protects a portion, but not all, of a man's property." (Emphasis mine.)

And the same judge, in another of the *Spring Valley* cases, 192 Fed. 144 (1911), answered the city's contention here that the master's view identifies the court's function with the legislative function, thus:

"It is not within the power of the Court to fix or regulate water rates. That is purely a legislative function and cannot be exercised

by this tribunal. *But whether rates already established are just and reasonable is a question for the Court.*" (Emphasis mine.)

To sum up: Due process implies just and full compensation. Just compensation for public service is given when the utility will enjoy from the legislative rates a fair return on the fair present value of its capital. Included in the fair return must, of course, be a fair net return. What is the fair or reasonable rate of interest to apply is a question of fact to be determined by a finding upon evidence. There is nothing in the Constitution nor in the nature of the question that requires that the legislature shall fix one rate, and that the Court must fix a lower rate. Upon both in equal measure rests the constitutional injunction to find the fair or reasonable rate of interest; and, therefore (in theory, at least), both may properly find the same rate applicable. The legislature's finding looks to the future. The Court's finding looks to the past; and if the Court finds that the legislature was clearly wrong, it is bound by its duty to so declare, and set aside the legislation. Such a declaration is not a fixing of rates, for it has no future force, nor a usurpation of legislative functions any more than any other declaration of unconstitutionality.

2000 But it will rarely happen, perhaps, that the legislative body and the Court will agree on the reasonable rate of interest applicable. There are two influences which normally, on the same evidence, ought to result in a legislative rate higher than the judicial rate. One is that the rate-fixing body may desire, as a matter of state policy, to encourage the growth of public service enterprises by offering a rate of return that is "more than fair," a sort of bonus, one that though temporarily burdensome to the consumers, will benefit them in the long run by more ample facilities. Thus, I am informed by the city's counsel on the argument (Arg., p. 913), and I think also by the evidence, that the Railroad Commission of this State has usually fixed 8 per cent as the fair interest rate, expressly stating that it was not a minimum. There can be no just criticism of this attitude; I believe that, on the evidence before me, I would be inclined to fix that rate if this were the rate-fixing tribunal. But the Court, on the other hand, is bound to find the minimum reasonable rate, and has no concern with matters of policy.

The other influence has to do with the presumption that prevails in favor of the legislative finding. The presumption of correctness does not refer merely to the burden of proof that rests on the plaintiff in any suit at law. It is the principle that attends any review of determinations by bodies or tribunals, upon whom is imposed the primary responsibility for decision, whether that body be jury, trial court, legislature or what not. The character of proof required to overcome the presumption of correctness is variously stated as between these various classes. Here the Court is considering the action of a co-ordinate body in our scheme of government, and comity requires the presumption to be strongly maintained. As regards this class of the general class of cases where a presumption is entertained, we have also various forms of statement as to the

degree of proof required. I prefer those which say that the proof should be "clear and convincing," or "manifest" (e. g., Missouri Rate cases, 230 U. S. 501), rather than those which over-emphasize the problem by requiring "flagrant," "gross" or "quasi-fraudulent" action by the legislature to turn the scale toward invalidity. It is thus seen that my objection to the term "confiscatory" as applied to the rate of interest arises solely from the fact that it has worked badly; has acquired the meaning of something less than fair.

Having determined the mental attitude with which the problem should be approached, I proceed to state why I have deemed too high plaintiff's claim for 8 per cent or $8\frac{1}{2}$ per cent as the lowest fair rate; and why, on the other hand, the city's claim for a 6 per cent rate seems too low. There has been nothing in the nature of a compromise about my decision of this point.

We must disabuse our minds at the outset of the notion that the face rate on government or other bonds, on preferred stocks or on secured notes has any but a remote bearing on the subject. We must also bear in mind the greater risks of any business enterprise; the fact that the cost of money embodied in the sale of securities is greater than the face rate paid the investor by the amount of discount and other expense incident to marketing the securities, and paying trustees, coupon-paying banks and others during their life; and, finally, that the securing of money at a given cost, if favorable, implies a margin of earnings above that cost. The reasonable rate is sometimes defined as that rate of earning which will attract necessary capital to the enterprise; sometimes as that which is customarily earned in business of equivalent risk. I emphasize the point that it is a rate to be earned, not necessarily one to be paid by the utility.

The plaintiff's evidence was given by Messrs. Lipman, Weeks and Hockenbeamer. All are expert witnesses of the highest qualifications. In response to the city's contentions in argument, I shall advert to possibilities of bias, but I am far from convinced as to the fact. It seemed to me that each was giving the Court the benefit of a sincere judgment based on a very full experience. Their testimony is too long to be adequately abridged, and so I am handicapped in doing it justice. I recommend it to the careful study of the Court.

Mr. Lipman is vice-president and one of the managers of the Wells Fargo Nevada National Bank, one of our largest institutions. There is no possible bias on his part unless we are so small-minded as to think that a banker will frame his judgment in the interest of a customer or that bankers as a class are enemies of the people. Viewing the problem from his contacts with investors, and from their standpoint, Mr. Lipman's opinion is that a public service corporation like the plaintiff in this vicinity and in the years in question should have been permitted to earn at least 7 per cent on the full capital required; and he added that he was "by no means sure that 7 per cent would be sufficient." (Tr., 2392-3.)

Mr. George K. Weeks has been the local executive of N. W. Halsey and Company and of the National City Company, dealers in securities on a large scale; the president of one of our suburban railroads, and a director of plaintiff, the latter office doubtless held

2002 to afford greater protection to clients to whom his company had sold securities. A possible bias may, of course, be taken account of, arising out of the fact that the prosperity of the public utilities enhances the prosperity of the investment banker. Mr. Weeks' opinion is that an earning of 8 per cent to 10 per cent is necessary for the utility to do the financing necessary to completely fulfill its public functions, that less than 8 per cent will handicap it in this regard, and that "less than 7 per cent, suffered over any extended period, will inevitably render impossible such necessary financing, and result in a depreciation in the value of the investment already made." (Tr., 2437.)

Mr. A. F. Hockenbeamer is the vice-president and treasurer of the plaintiff. Upon him has rested the tremendous responsibility, with its attendant labor and worry, of obtaining the vast sums of money that the growth of the Pacific Gas & Electric Company has required. From that experience (and his experience before that) arises at once his ability to advise the court, and the possible bias that may affect his judgment. His testimony is a very complete and valuable presentation of the subject. His conclusion is that $8\frac{1}{2}$ per cent was the lowest rate that would attract capital in the years in question, unless opportunities for speculative profit were presented; and that these opportunities did not exist. (Tr., 3161.)

In view of the magnitude and diversification of the business of the Pacific Gas & Electric Company, Mr. Hockenbeamer thinks it has been more attractive to the investor than a single gas company in San Francisco would have been; and so the costs of its financing seem to him to furnish evidence of assistance in the problem before us. He describes its financial structure—bonds, preferred stock and common stock. The cost of money derived from sales of 5 per cent bonds in the years 1912-16 averaged 6.20 per cent; from 6 per cent preferred stock, sold direct to consumers and the public generally without selling commissions, 7.40 per cent. (Tr. 3101.) We are all familiar with the fact that any loan on mortgage is made with a margin of safety of at least 40 per cent of the value of the security. Mr. Hockenbeamer (and Messrs. Weeks and Lipman agree with him) has done a service in making explicit and obvious the fact that rates of cost of money such as those quoted above are contingent on the existence, not only of a margin or surplus of capital behind the money loaned or invested, but of a margin of earnings above the amount necessary for interest and dividends. "Opportunity to liquidate their investment in the market at original cost or better is

2003 also an important consideration to both the bond and investment stock buyer; in fact, convertibility is probably the most important factor in the cost of money. Convertibility rests upon demand, demand rests upon confidence and confidence is largely based upon margin of safety in earnings, well maintained over a series of years. Earnings in excess of charges are the chief barometer by which the market determines a utility's credit and whether it will give to it new capital and at what cost." (Tr. 3104.) Thus in bond mortgages it is provided that bonds may be issued in such amounts only that the net earnings shall always be from one and one-

half to twice the total bond interest. (Tr. 3110.) The margin the investor demands for preferred stock Mr. Hockenbeamer fixes at 40 per cent of earnings in excess of combined interest, bond discount and preferred stock dividends, as a minimum. (Tr. 3111.) As for common stock, he thinks there must also be a rate and a margin greater than for preferred stock, but experience does not show how much greater it must be. (Tr. 3111.)

Speaking from the experience of the company, and, on the premises stated, Mr. Hockenbeamer estimates the cost of obtaining \$100 from the investment market thus (Tr. 3181):

\$60 bond money, @ 6.20 per cent.....	\$3.72
\$20 preferred stock money, @ 7.40 per cent.....	1.48
Total	\$5.20
40% margin for preferred stock	2.08
20% common stock money, @ 8 per cent.....	1.60
Total	\$8.88

Mr. Hockenbeamer also believes that if the company could earn 8 per cent dividends on its common stock and a margin or surplus equal to those dividends, it could sell its common stock at par and obtain its bond money on a 6 per cent basis and its preferred stock money on a 7 per cent basis. (Tr. 3182.) On this theory he makes an alternative computation, thus:

\$60 bond money @ 6 per cent.....	\$3.60
\$20 preferred stock money @ 7 per cent.....	1.40
\$20 common stock money @ 8 per cent.....	1.60
Margin of safety for common stock.....	1.60
Total	\$8.20

2004 Eliminating margins, the first computation shows a total cost of money of 6.80 per cent; the second a cost of 6.60 per cent. The 7 per cent rate chosen by me as the lowest reasonable rate thus shows a margin of .20 per cent or .40 per cent. Mr. Hockenbeamer's reply to this showing of some margin existing is, of course, obvious. (Tr. 3216.) He would say that the margins thus shown would not obtain the money at the cost used; that I have, in other words, used his deduced facts while abandoning his premises.

There are several reasons why I have not adopted the plaintiff's rate of 8 or 8½ per cent. Some reasons have been indicated, some will be indicated later on. The chief reason is that Mr. Lipman and Mr. Weeks have stated 7 per cent as a minimum fair rate of earning. Furthermore, despite this company's greater strength at present as an economic unit, due to its magnitude and the varied character and wide extent of its business, as compared with the characteristics of financial strength possessed by the San Francisco gas department alone, I am not so sure that this was true in 1913-16. For

one thing, the company was then engaged in extensive hydro-electric construction. The very extent of its demands upon the money market might have had a tendency to increase the costs of its money. Furthermore, time was needed to demonstrate the extent of water available, the stability of the new works, the power of the market to absorb new supplies of electric energy. It may be true now that electricity has a surer market and a more certain basis of production than gas; for it is only recently that it has become evident that the dependence of gas manufacture on the oil supply has elements of serious risk, both as regards the supply itself and its cost. But this was not so evident in 1913-16. In brief, if the gas department in this city had been a separate company in 1913-16, it would have needed less money and might have seemed less risky to an investor than the company as it was in fact.

I add certain other facts that have been considered in reaching a conclusion.

The current rate of interest on notes secured by mortgage of San Francisco real estate, with a margin of security equal to 40 per cent to 50 per cent of the principal of the loan, was $5\frac{1}{2}$ to 6 per cent. (Tr. 2395, 2435.) The rate on country mortgages, that is, mortgages on property in California outside of San Francisco, is given as 6 per cent to 7 per cent by Lipman (Tr. 2377), and 6 per cent to 8 per cent by Weeks (Tr. 2435). The average rate of 2005 interest on farm loans in California is given by the Federal Farm Loan Board as 7.6 per cent (Tr. 3176, 2435). In all such investments there is a varying minimum of risk.

The reports of the Comptroller of the Currency (Tr. 3177-79) show the following dividends paid by national banks in the Pacific states in percentages of the combined capital and surplus: Year ended June 30, 1913, 8.05 per cent; 1914, 8.37 per cent; 1915, 7.01 per cent. The statistics for California or for San Francisco are not available. The banker aims to take no risks whatever in his loans.

The evidence does not enable me to state with certainty "the lowest rate sought and generally obtained in banking, merchandising and other businesses in the vicinity," to quote the language of *Lincoln Gas & E. L. Co. v. Lincoln*, decided June 2, 1919, by the Supreme Court of the United States. I have given what the record shows as to bankers' dividends. A table on page 3853 of the transcript shows, as to twelve representative stocks dealt in on the San Francisco exchange, the percentages of earnings to the market values of the stocks. These range from 7.8 per cent to 49.7 per cent. I think no objection could well be made to an estimate of 8 per cent as the minimum rate of earning in commercial business.

The "legal rate" of interest in California, that is, the rate made applicable by statute where the agreement of the parties is silent in that respect, is, and was in the years in question, 7 per cent. (Civil Code Cal., secs. 1917, 1920.) This is the rate applied on judgments, for example, both in the state courts and in the federal courts in this state. It has been stated early in this report that the restraining orders herein were issued on the giving of bonds with conditions that if the bills were dismissed after final hearing, the plaintiff would

return to its consumers the excess charges collected over the ordinance rates, together with interest thereon at 7 per cent per annum. The fixing of this interest rate does not amount to the determination of the rate of permitted earnings here sought, in the sense that the court might now agree with plaintiff that 8 per cent or $8\frac{1}{2}$ per cent is the rate to be allowed. But, on the other hand, the court could hardly with justice fix a lower rate. The condition in the bond is not a penalty, but is aimed to compensate the consumers for the withholding of their money, including the value of its use. Certainly if plaintiff is to pay 7 per cent on these excess earnings if the bills are dismissed, it should be allowed to earn in its business that rate at least which it is required to return to the consumers.

2006 The treatment of this subject will not be complete without further reference to the related subjects of risks of the business and margin of safety or surplus of earnings.

It is, of course, obvious that rates of interest vary with the risk of the investment. Mr. Lipman has classified these risks as risks of delay, risks of uncertainty and risks of inconvertibility. (Tr. 2378, et seq. He has treated them fully and I shall not repeat or summarize his testimony. I shall point out certain risks of plaintiff's business, as a whole, that influence the rate at which it may command capital:

1. The risks of any business enterprise. This is mentioned to point the difference between the rate of interest which will attract an investor in bonds, mortgages or other evidences of debt, and the rate which a business enterprise must offer to induce the investor to assume the responsibility of an owner. The difference needs only to be stated, yet too often courts have applied in proceedings like this the rate proper for secured debts. On that basis, obviously, we should have no owners, when it afforded no additional inducement for the extra risk. All investors would prefer the safety of the secured creditor.

2. The risks peculiar to public service enterprises. One of these is the danger of municipal competition or of condemnation by the municipality with the dangers of loss inherent in such litigation. Both of these, I think, were negligible as regards this plaintiff in the years herein under consideration. The chief risk to be considered arises out of public regulation of price to be charged for the service. From the investor's standpoint the company's officers would be more likely to produce satisfactory earnings than a public body. But even though he accepted the inevitable in that respect or even affirmatively approved the policy of regulation, he must recognize inherent dangers in it. The rate-making body might be ignorant, radical, lacking in courage, or moved by considerations of politics. We have, I think, to a great extent passed through that stage. But there remains the fact that, given men of high type and sincere desire for justice on both commissions and courts, there is possible wide difference of opinion in critical matters, for the principles of law are often unsettled and controverted, and the determi-

nation of the facts of value or other important issues rests upon judgment, with its attendant possibility of human error. On the other hand, governmental regulation, wisely applied, should increase stability by restraining greed, unwise financial practice or unfair discrimination.

3. The risks peculiar to the gas business. Some of these are peculiar to all manufacturing enterprises: Supersession of equipment by improved machines or processes, occurring before adequate reserves for replacement had been provided; chances of honest error in the intricate accounting that attends a manufacturing enterprise; chances of competition of other companies, in this case minimized by the wise provisions of the Public Utilities Act, requiring the prior approval of the Railroad Commission; chances of competition with other products, as for example, electricity. There may finally be mentioned what Mr. Hockenbeamer points out (Tr. 3091, 3170), the dependence of the gas industry upon the oil industry for its raw material in large quantities and at reasonable prices. Since the period of these ordinances there has been a doubling in the price of oil, due to increased demand both for crude oil and for its refined products. Furthermore, if the California oil fields become depleted, lacking nearby coal, the gas business might come to an end.

4. The risks of operation in the vicinity. This is an earthquake country. Slight earthquake damage is covered in the operating expenses. The rare catastrophes, such as that of 1906, in which plaintiff suffered heavy loss, I have taken no account of except to consider the risk covered by the rate of current return applicable to all business here exposed to the same danger. This local risk is only mentioned to differentiate the rate here from that in other localities.

The witnesses in this case, especially Mr. Hockenbeamer, have done a service in pointing out two things: (1) that the rate we seek is a rate of earning, not a rate paid on securities; (2) that this rate of earning must contain a margin of safety, a surplus. The purpose of this margin is to secure the continuance of the stipulated dividend or interest against all the contingencies of business. There are lean years to be made good. Catastrophes or unforeseen expenditures must be provided for. These may arise, for example, out of sudden increases in labor or material costs, and these losses must be provided for until the rate-fixing authorities authorize increased charges. All these are losses of an unusual kind; but there are also charges against a surplus of a constant and ordinary character. This has been made evident in my discussion of the audit of operating expense. The requirements of the official accounting regulations of the State Railroad Commission and the contentions of the city in this case both designate a number of proper corporate expenditures as charges against surplus. This seems to be an admission that the rate of return must be such as to provide such a surplus. The table in the appendix will show in the allowances of the city's deductions many illustrations of this statement. For example, the original stock and bond discount and expense raises the cost of

money over the face rate and its amortization must be made out of the earnings. But in addition there is an expense that continues through the life of the security which, following the city's accountant, I have deducted from operating expense and charged to surplus. These expenses comprise trustees' fees, charges of banks for paying coupons, lawyers' fees, advertising and many others of that character (Appendix I, item 1). There are many others, which, to be sure, the community does not guarantee shall be earned, which the investor, nevertheless, would expect might possibly be earned. Examples are the costs of litigation like this, donations to charity, etc.

I have sufficiently indicated, I think, why the city's rate of 6 per cent seems too low to be fair. I have not referred to the city's evidence. No expert evidence was introduced, though in my opinion no court is competent to determine a rate of return without the assistance of qualified advisers. The reason stated by counsel (Arg. 727-8), is that no financial expert could be found willing to testify against the plaintiff. I am more inclined to believe, from hearing the evidence, that well-informed experts would not support the city's position; and if any banker would refuse testimony favorable to the city through desire to keep plaintiff's account, I believe his intelligence would prove as flabby as his courage. The city produced two witnesses, Messrs. O'Brien and Boston. The former had gone through the mortgage records of the city and county and gave a table of large mortgage loans (Exh. 100) showing rates from 5 per cent to 6 per cent. As Mr. Weeks pointed out, not only would legal fees and expenses be added, but often brokers' commissions. Mr. Boston, an accountant (Exh. 101), offered a tabulation of selected stocks and bonds dealt in on the San Francisco exchange, aimed to show an average basis of return upon which investors were willing to buy securities. Mr. Hockenbeamer has pointed out the weakness of this sort of evidence. (Tr. 3837 et seq.) In the first place, an average of income from securities of companies of varying hazards fails to indicate with precision the desired rate for any particular company. In the second place, the rate basis upon which a security sells is no indication of what it should earn. He shows, too, that the securities which sell on a low income basis usually earn much beyond their interest and dividend requirements.

Finally, I may anticipate the argument of the city that however I may disagree with the reasoning of the latest Spring Valley Water Company decision (*supra*, p. 115), I am bound by the court's finding that 6 per cent was not an unreasonable rate. If this were another water company I should feel bound. But it by no means follows that the same rate should apply to a gas company; and I mention the following reasons:

(1) The gas company manufactures as well as distributes its product and has the additional hazards that attend manufacture. For example, its apparatus for making gas is subject to sudden

obsolescence; while a water company has no machinery beyond pumps and their power plants, all well standardized. The gas company, as stated before, has many of the hazards of the oil business, because oil is its principal basis of manufacture; the water company is affected by the price of oil only in power production, and if oil gave out, could turn to electricity or coal.

(2) The gas company is exposed to the hazard of competition, in marketing its products, with other products; and there is always the possibility of substitution. There is no substitute for water.

(3) Finally, in view of the court's reliance on precedents, I may mention the decision of the Supreme Court, rendered June 2, 1919, in *Lincoln Gas & E. L. Co. v. Lincoln*. There the court held that 6 per cent could not be considered a non-confiscatory rate under the evidence, saying:

"We cannot approve the finding that no rate yielding as much as 6 per cent upon the invested capital could be regarded as confiscatory, in view of the undisputed evidence, accepted by the master, that 8 per cent was the lowest rate sought and generally obtained as a return upon capital invested in banking, merchandising and other businesses in the vicinity; 7 per cent being the 'legal rate' of interest in Nebraska."

The court did not state explicitly what rate it had in mind as the minimum fair rate; but to me there is the suggestion that it had 7 per cent in mind in what is quoted above, and in the following concluding sentence:

2010 "We are unable to say that the master erred in holding that the ordinance was not shown to have been confiscatory in its effect. It is probable that in the years 1907 and 1912 the net return was close to the line, if not below it; but that in the other years examined it was at least 7 per cent." * * *

Summary—Fair Return on Value of Capital Used and Useful.

It is now before us to apply the minimum fair rate of 7 per cent to the appraised value of the capital in the various years (ante, p. 101); and the following is the result:

	1913-14.	1914-15.	1915-16.
Value	\$13,976,435.00	\$13,985,772.00	\$14,415,674.00
7 per cent.	978,350.45	979,004.04	1,009,097.18

Summary—Total Costs or Reasonable Gross Revenue.

Since we have determined the proper operating and maintenance costs, taxes, fair allowances to reserves for depreciation, fire hazards and casualties, and now the minimum fair return on the capital, we have accounted for all the costs of producing and distributing gas.

In other words, we have determined what plaintiff's reasonable gross revenue, at a minimum fair figure, ought to have been in the three years in question.

The result is as follows:

	1913-14.	1914-15.	1915-16.
Operation, etc. (p. 110)	\$2,031,926.11	\$2,168,931.37	\$2,198,603.49
Reserves—			
Depreciation (p. 106)	348,853.00	372,680.00	380,519.00
Fire (p. 106)	10,000.00	10,000.00	10,000.00
Casualty (p. 106)	15,000.00	15,000.00	15,000.00
7% return	978,350.45	979,004.04	1,009,097.18
Total	\$3,384,129.56	\$3,545,615.41	\$3,613,219.67

Comparison of Fair Gross Revenue and Gross Revenue Under the Ordinances.

The company's gross revenue is, of course, known, and it is possible to compute, by mathematical changes, what the revenue would have been at the 75-cent maximum rate of the ordinances. 2011 The city contends, however, that the revenue would have increased because of increased consumption at the lower rate, and there is much evidence both ways on this point. It is a difficult matter to determine, but fortunately, not here necessary. To make the calculation, I will assume, with the plaintiff, that the consumption would not have increased. The company's estimates of revenue and those of the city differ by only a few thousand dollars. The company's figures are lower, and I accept them for the purposes of this computation only. The comparison shows:

	1913-14.	1914-15.	1915-16.
Ordinance Revenue	\$3,405,532.51	\$3,635,061.53	\$3,784,684.15
Fair Revenue	3,384,129.56	3,545,615.41	3,613,219.67
Difference	\$21,402.95	\$89,446.12	\$171,464.48

It thus appears that if the property has been properly appraised, and other elements in the problem rightly applied, the city's ordinances would have produced revenues securing more than the 7% net return deemed to be the lowest amount that would not result in confiscation. It would follow that the several bills of complaint should be dismissed. Plaintiff's counsel, however, urges several arguments adapted to prove that the whole procedure of valuation adopted in this report is on a wrong basis.

Reasonableness of Rate—Book Costs and Purchase Cost as Evidence of Value.

It has been pointed out early in this report (ante p. 3) that the city's ordinances do not fix a schedule of rates according to consumption, but simply a maximum of 75 cents a thousand cubic feet of gas consumed. The company was thus left free to charge all consumers at this rate, or at a rate less than 75 cents, or to establish a schedule at that price and less, graduated according to consumption. There is, however, a great deal of evidence going to show that the business of the large consumers could not have been secured at all except at a price substantially less than the maximum; and it also appears that this business is very profitable. (See Arg. 933). When the restraining orders enjoined the operation of the ordinances, the plaintiff, as has been seen (ante p. 4), established schedules of rates, graduated downward from 85 cents.

2012 It is now contended that the evidence shows that the cost of gas to small consumers is much greater than 75 cents, and that the state may not require the plaintiff to serve any consumer or class of consumers at a loss, even though the entire business done may show a satisfactory profit. Counsel relies on *Northern Pacific R. Co. v. North Dakota*, 236 U. S. 585. The evidence upon which plaintiff relies is contained in a series of elaborate computations, with supporting testimony by Mr. Vincent (Exhibits 73, 74, 75, 76). These computations are in some degree vitiated by the findings in this report. Whether the material is at hand for a recomputation I do not know; certain it is that it would be, for the master at least, a task of many weeks. It seems to me unnecessary. I will assume that plaintiff is right, without deciding the point. According to plaintiff's counsel (Arg., 308), this evidence shows that the cost in furnishing a consumer 1,600 cubic feet of gas (exclusive of return on the capital employed) would be \$1.26, and the revenue at 75 cents a thousand would be only \$1.20; in other words, that before the company could get any return on its capital at all at the 75-cent rate, the consumer must use in excess of 1,600 feet. Further, 42,000 consumers out of a total of 104,000 used less than 1,600 feet a month (Exh. 73, p. 25). Even 3,000 feet would, according to counsel, give a total return less than cost plus an 8% return; and there were about 73,000 consumers taking that amount and less.

The obvious answer, one by way of confession and avoidance, is that the same objections are applicable, in only slightly less degree, to the schedule at 85 cents, top rate, which the company's directors established of their own free volition. (Tr. 2515.) Counsel's reply to this is, first, that the costs shown by these computations have not been fully understood by the company's officers (Arg. 312), and, second, that it was the company's privilege to give away its property if it chose, as a matter of policy, but it was not permissible for the state to compel it to do so. The reply seems to me inadequate. For the establishment of such schedules by the company means in effect that it holds itself ready to serve all consumers whatever their

demand, even at a loss for part of the business. Rate-making is a practical business, and the regulating authority has the same right to classify in a schedule that the company has. (236 U. S. 598-9, 604.) If the state is to make a schedule that is reasonable, it must consider business policy, and has a reasonable latitude of discretion in so doing. It is not equally open to the state as to
2013 the company's officers to determine that it would be wise to make a losing rate to the smaller consumers, when otherwise those consumers might not use gas at all? And, furthermore, I am not convinced that the company's managers were blind to the facts when they fixed an 85-cent rate. It is good business to get a new consumer, even if he uses only 1,600 feet or less, for the consumer who starts using gas for cooking is likely to extend his uses of gas to gas-grates and water-heaters and so pass to the 3,000-feet class and beyond. Mr. Lowe, who has had extensive experience, shows that the serving of small consumers at a loss is generally recognized practice in the gas business. (Tr. 3,295.) And so the plaintiff's annual report for 1913, p. 38 (Exhibit 102), mentions the "growing preponderance of the smaller users of its products" with evident satisfaction, saying, "The stabilizing influence of the smaller unit business, which is not materially affected by adverse business conditions and may be depended upon for steady growth and increasing returns under any and all conditions, is a factor of undoubted importance."

It may also be noted that costs of production have, until recently, been going down, due, first, to the substitution of oil for coal as a basic material, and, later in time, to the improvement of oil-gas processes; and there has been a corresponding lowering of price. But it will be observed that rates between \$1.30 and \$1.50, which counsel contends are necessary as maximum rates to compensate for consumers of low consumption, have not been in effect since the early years of the present century. (Exhibit 40, pp. 11 et seq.; Exhibit 52.) For the year 1904-05 the company voluntarily fixed a \$1.00 rate.

It would be strange to find that the Supreme Court has declared a practice of rate-making illegal, that has so long prevailed and has seemed justified by the business policy stated. The North Dakota Coal case above mentioned (236 U. S. 585) was one where the state, for reasons of public policy looking to the development of large supplies of lignite coal, established rates for transportation of this coal which the court found were "less than cost, or without substantial reward" (p. 598); and justified this on the ground that the rates on all traffic operations within the state showed an adequate profit. The Supreme Court held that this could not be done; that as a carrier for hire it had not held itself out to transportation of any commodity that showed a loss, and so it was not within its public duty (p. 595).

2014 But the court also pointed out that it was not shown that the practice of carriers in North Dakota afforded "any semblance of support to a rate so low" (pp. 597, 599). I have shown that the present case is distinguishable in this regard.

The court referred with approval to *St. Louis & S. F. R. Co. v.*

Gill, 156 U. S. 649, where the allegation and offer of proof that a maximum passenger rate would compel a loss related only to a portion of the road and not to the result of all the traffic to which the rate applied. The court said, "The holding that this was insufficient was in entire accord with the above-stated principle,—that the rate-making power may be exercised in a practical way, and that the legislature is not bound to assure a net profit from 'every mile, section, or other part into which the road may be divided.'"

Comment was also passed on the ruling in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, where the court justified a rate to the municipality lower than that to other consumers by reference to the fact that the total returns from all sales of gas were adequate. As to this, the present opinion says, "It was not established in that case that this 'wholesale' rate required a service without substantial compensation in addition to cost." (p. 601.) Such a test lends some support to plaintiff's argument here.

The court also said (p. 601): "It has been repeatedly assumed in the decisions of this court that the state has no arbitrary power over the carrier's rates, and may not select a particular commodity or class of traffic for carriage without reasonable reward."

In the case at bar, no particular commodity is selected. If the state should make a confiscatory rate for gas, and attempt to justify it on the ground that the returns from electricity and other departments of plaintiff's business were such as to render the entire business profitable, the North Dakota case would seem in point. Here the state makes no schedules and selects no particular commodity. It simply fixes a maximum rate of charge, which for a large part of the business done is admittedly ample, and for the entire business has been here found to be adequate. The attack must take the form of saying that the rate has the necessary effect of selecting a "particular class" of consumers, the small ones, who form a majority, to be served without remuneration. It is not easy to put the distinction between this and the North Dakota case in words, but I believe it exists. First, the present case is rather within the principle of

R. Co. v. Gill, and, second, the rate-making policy which it embodies is justified by past and present practice, both of this plaintiff and of the gas business generally.

Book Costs.—There is a mass of evidence in this case directed to show that the methods of valuation herein have failed to reach a just rate base. Some of this evidence has to do with the book costs, some of it with the purchase cost to the present plaintiff. This class of evidence is offered and received in deference to the well-known doctrine of *Smyth v. Ames*, 169 U. S. 546, 547.

Book costs are useful and may often be determinative of plant values, as respects entries of recent date; indeed, they have been here used, for example, to determine the amount of additions and betterments in the years under examination. But, as I have said many times, it seems to me that in an old plant book entries are worthless as evidence of value. Consequently, I shall not go into the mass of evidence and argument with a view to a finding of book cost or of original cost, but shall content myself with stating the

contention of plaintiff to the effect that the book value is \$20,000,000 in round figures.

The city's counsel disagrees with the master in that he approves valuation by original cost, but he denies that these are shown by the book costs, or that the book costs are authentic. (Arg. 473.) It is not pretended that the book costs show actual costs; the books have at times been written up as to plant values, and at times written down. (Tr. 367.) Furthermore, the evidence here is not the original books, which were destroyed by the fire of 1906, but a book of statistics, which chanced to be saved. The correctness of its entries is disputed and, in part, with apparent reason. The city further claims (Arg. 477 et seq.) that the record entries are in cases inflated; that the total contains amounts for the value of expired leases and patent-rights; for abandoned property not written off, etc. Objections like these, of lack of authenticity, of improper accounting by present standards, and the like, are typical of those which may be expected in any endeavor to prove original cost by old records.

But I prefer to rest the rejection of this evidence on the fundamental ground that original cost is no evidence of present value or of a just rate-base. In the Spring Valley Water Company's case original cost lower than cost by present reproduction cost and market value was rejected; here the original cost is claimed to be higher and meets the same fate. I cannot see what the cost of land 2016 or a line of pipe in 1873, though these are now in use, has to do with the value or basis for earnings of that property in 1913-16. Property should earn on its present market value, the value to a buyer. Accordingly, we have rated plaintiff's lands at market value. Its structures cannot be valued directly by that method, but we have reached the same result by the cost of reproduction, or present replacement. The merit of the cost of replacement method is that it conforms to economic changes in the value of the dollar. Its practical application has been made evident to many of us in the present abnormal conditions. For example, dwellings are in demand. Land remains at about the same value as in 1914, but building costs have advanced, say 70%. What actually happens in a case of purchase and sale is that the land is estimated at a price; the building built, say in 1914, is estimated at 70% advance over cost, and some depreciation deducted; and trades are made on this basis, the amount over or below the value thus reached being governed by the ordinary incidents of bargaining. As this court said in the last Spring Valley case, 252 Fed. 989, the original cost theory of valuation has been repudiated many times by the Supreme Court and the question is no longer open. And so I think the showing as to book costs is entitled to no further consideration.

Purchase Cost.—The various separate properties which now form the plaintiff's system in San Francisco were gathered together by purchase in 1905 and January, 1906. This was before the effective date of the present public utilities law, which, to avoid undue issues of securities and burdensome rates, requires that sales of public utilities be approved as to price by the Railroad Commission. If that approval had been had, we might properly start with that price as a

basis for computing the value, the proper rate-base for 1913-16. But even without that approval by public authority, the plaintiff is on fairly strong ground in offering the facts of the transaction seven or eight years earlier as a reasonable guide to the value of the plant. We are accustomed to say that elaborate appraisals by cost of reproduction, etc., such as this report presents, are necessary because, unlike land or commodities of current commerce, public utility plants are rarely bought and sold. But here we have an instance where the sale was not remote in time and where the parties to the transaction reached an agreement in ordinary dealing at arms' length. The city, in answer, contends that, so far as the San Francisco Gas & Electric Company was concerned, it had an advantage in its established monopoly both of gas and electric distribution, and in the possession of a very large surplus to take care of approaching obsolescence of gas-generating machinery; the buyers, on the other hand, were in need of a market for the product of their hydro-electric plants, and were offering in payment of the purchase price, to the extent of about three-fourths thereof, the securities of a newly promoted corporation, the future of which was at the time uncertain. (Arg., 483-6.)

Plaintiff contends that its evidence shows that the value or rating base for its property on the basis of purchase cost, making an estimate of the then value of the securities involved in the price, and adjusting for subsequent additions, abandonments and losses of capital, ranged from about \$20,000,000 in 1913 to about \$21,500,000 in 1915. (Arg., 163.) It is claimed by the city that these figures are in excess of value for the reasons above stated; that, in addition, the sale was probably based on the J. G. White inventory and appraisal, which was higher than the Jones appraisal, but is not in evidence. It is not possible with any sureness of perception, and I think unnecessary for me to resolve these conflicting claims and state in dollars and cents, to what extent the figures should be reduced. I shall assume, for the discussion, that plaintiff is right, but make no finding.

If there were no doubt in the purchase cost figures, and there were thus shown a bald discrepancy of five or six million dollars between what plaintiff paid for its properties and the master's present appraisal, it would mean that either the master or the purchasers had made a mistake, and, naturally, I would stand by the verity of my own considered judgment. But these assumed purchase cost figures, taken as a whole, may properly perform a useful office as a check on separate items or divisions of my appraisal. Take first the appraisal of lands and of the structures as new. The figures I have adopted are here agreed, except for the unimportant difference in allowances for overhead. It is thus possible that if the purchasers had before them an appraisal differing from the Jones appraisal they paid too much; the mistake cannot be mine. I have excluded from capital the items of paying over mains and duplicated mains. Both these items are undoubtedly represented in the purchase costs. The first is excluded on the authority of a Supreme Court decision. The other exclusion is from operative property, which I believe is well-

2018 founded. The company still owns these mains, and if it at any time livens them up they will enter the rate-base. Take next my deduction of depreciation. I am satisfied with my treatment of that matter. If I had handled this question by the replacement method, as, perhaps, the purchasers did, it would account for about \$1,500,000 of the discrepancy; but since the allowed annual contributions to reserves would be very much less, the result of this litigation would not in this case be changed (ante, p. 80). In the appraisal of needed working capital, the purchase costs seem to offer no assistance. Take next the matter of franchise value. It may be that the purchasers paid something on this account; we do not know. But whether they did or not, I am entirely satisfied, though my view is opposed to that of a lawyer whose great abilities I respect in the person of plaintiff's counsel, that as a matter of law there was and is no money value in the franchise. There is left the matter of going value. On the evidence in this case I might have increased the total appraisal by at least \$1,500,000 by valuing this item at \$3,000,000 instead of \$1,500,000. In finding the amount to be added for going value there is inherent the difficulty that it is not capable of convincing mathematical demonstration, but must depend largely upon sound judgment upon the evidence, necessarily very conservatively exercised; and in such judgments the chance of error is necessarily great. Obviously purchase cost figures, like those submitted, tend to show that the purchasers were willing to pay more for the established business than I have allowed; that, in other words, I have been so conservative in my allowance that at least the first two suits here have been lost to plaintiff. But in such uncertain matters as this precedents have a value that I have denied them where the conclusions to be drawn from facts are more obvious. To allow \$3,000,000 for going value would fly in the face of the latest decision in this court. *Spring Valley Water Co. v. San Francisco*, 252 Fed. at p. 985. That company's capital was appraised by the court at about \$34,000,000; its gross revenues were about the same as the present plaintiff's; the present master, on evidence at least as strong as that now before me, had allowed for going value the sum of \$3,400,000. The court characterized this as excessive and allowed \$1,400,000. I cannot say how my mind would have reacted to the proof here if this decision had not been before me, but certainly I am not justified in overlooking it to the extent of raising the figures already arrived at. My conclusion must be that the assumed purchase costs only show that, unfortunately for them, the purchasers paid too much.

2019 There are other questions treated in the evidence and the argument which it seems unnecessary to discuss.

I conclude that the methods of valuation and of determining the sufficiency of the revenues under these ordinances have been fair and correctly applied.

Conclusions.

From the foregoing I conclude:

1. That the ordinances of the Board of Supervisors of San Francisco, herein complained of, fixing rates for the supply of gas to the city and its people in the years 1913-14, 1914-15 and 1915-16, if they had been in effect, would have afforded plaintiff a fair return on the fair present value in those years of plaintiff's property used and useful in that service; that they provided a fair and just compensation for said service of gas; and that they were valid under the Constitution of the United States.

2. That defendant should have decrees in its favor that the bills of complaint herein should be dismissed with costs to defendant city, together with such damages as may have been incurred or suffered by reason of the temporary restraining order heretofore issued in this court, to be paid to the City and County of San Francisco for its own use and benefit.

3. That said decrees should also provide that the plaintiff should be directed to return to its consumers all charges in excess of the ordinance rates collected between the first day of July, 1913, and the 29th day of October, 1917, together with interest thereon at the rate of seven per cent from the dates of such collections.

The foregoing is this day announced to the parties as my draft report herein.

Objections to the report will be filed with the master within a time to be fixed in the letters of notification. These objections having been considered and acted upon, the master will thereafter settle, sign and file his final report with such supplemental report as may be necessary; and of this filing the parties will be notified by mail.

Dated December 15, 1919.

H. M. WRIGHT,
Standing Master in Chancery.

2020

Supplemental Report.

On December 15, 1919, in accordance with the settled practice and rules of this court, the foregoing report was submitted to the parties as a draft and objections were invited to be filed by January 10, 1920. The city filed its objections on that day; the plaintiff, pursuant to leave granted, on January 24, 1920. The said objections of plaintiff and of defendant, to each of which is annexed a stipulation of respective counsel that the objections thus taken shall stand as exceptions to the report when returned without further filing, are herewith separately returned and filed with the clerk.

It should be said with some reference to what I shall say hereafter that various portions of the report were submitted to the parties for

checking over at various times during the year 1919, when the writing of the report was in progress. For example, on August 5, 1919, I submitted to the parties for checking over and carrying forward my final figures on depreciation in such form as to clearly disclose the method which would be followed in the report. (See page 78, ante.) Later, on December 3, 1919, I submitted to the parties for checking over the entire draft report except the last paragraph of the treatment of Going Value (p. 95), the figures for Going Value and total of property on page 101, and the matter from page 111 forward, except for appendices, which were furnished.

The objections of plaintiff are twenty-five in number. As might be expected, in many respects plaintiff's counsel repeats views expressed in his argument, all of which have been already carefully considered and adversely decided. There are places here and there in the argument accompanying the objections which state in effect that the Master has not considered this point or that, where a careful re-reading of the report would disclose that the matter had been in fact considered and explicitly decided. I shall not repeat myself in these respects, and most of the objections will be overruled without comment. There are several, however, of sufficient importance to deserve more or less extended treatment in this supplemental report.

Objection No. 4 refers to the matter of exclusion from reproduction cost of the distribution system of the item of pavement over mains; and objection No. 7 (a) refers to the omission from the annual allowance for depreciation of a contribution to the
2021 replacement of pavement which will in fact be necessary when the mains are replaced. So far as the first objection is concerned, I have already indicated in my report (pp. 27 et seq.) that the matter is definitely ruled by the decision of the Supreme Court of the United States in *Des Moines Gas Co. vs. Des Moines*. I have also sufficiently indicated that in point of theory the decision seems to me open to objection, but that it would have to be followed until changed by the Supreme Court. The second point of objection is explicitly referred to in the report at page 30, where I stated the difficulty and said that if the matter were deemed material it would be considered in connection with the subject of depreciation. In fact, it was considered but not mentioned, and I did not include in my annual allowances to replacement reserve any sum to provide for the item of paving which will undoubtedly have to be met when the pipes are replaced. It was my view then and it is my view now that this choice is more nearly consonant with the rule in the *Des Moines* case, and that plaintiff will be protected if, when the replacement takes place in the future, the paving cost is not charged to the depreciation reserve, but is carried into New Capital account at that time. This is the other alternative which was suggested as possible in the paragraph on page 30. These objections are accordingly overruled.

Objection 5 and various of the succeeding objections depending upon it call attention to a plain error of statement on my part which is sufficiently important to deserve extended consideration. The ob-

jection is to the statement made on page 67 of the report (and it occurs in various other places throughout the discussion of depreciation), that "the modified sinking fund method is in all respects the equivalent of the sinking fund method". In paragraph (f) of the argument supporting objection 7 counsel contends that the true equivalent of the sinking fund method is what has been called the "Adams' Third Method", and that in the determination of present value and annual allowances to depreciation reserves this method should have been followed. Incorporated in objection 5 are two tables comparing the sinking fund method and the modified sinking fund or compound interest method when different rates are used for the sinking fund and for the owner's return. I have not checked these tables to determine their correctness in detail, but the principles which they embody are undoubtedly correct. In other words, it is a fact that the modified sinking fund method described by me in the report is the equivalent of the sinking fund method and is in all respects just to both parties only when the interest rate assumed for sinking fund accretions and for owner's return on investment are the same, as assumed by me in the illustrative tables. If the rate used for the sinking fund is less than the rate used for owner's return the total payments for service to the owner are progressively less during the life of the item under consideration, and to that extent the owner fails of his full return. Likewise, if the sinking fund rate were greater than the rate assumed for owner's return, the total payments would be progressively greater. The importance of this error arises out of the fact that I have adopted seven per cent as the owner's return and five per cent in calculating depreciation reserve. To explain how the error arose, to estimate its significance and to understand the Adams method referred to, it is necessary to refer again to the development of this question of depreciation in this court and to make some reference to mathematical formulæ.

I have referred at pages 34 and 35 to the case of Contra Costa Water Company vs. Oakland, reported on by the present Master in 1916 and confirmed by the court. I have said there that the company's engineers adopted what I have called the modified sinking fund method. This is not accurate; it was stated under the influence of the momentary forgetfulness of the effect of differing interest rates which I have referred to above. In fact, Mr. Adams, who was an accomplished mathematician, clearly pointed out that what I called the modified sinking fund method was true only when the two interest rates were the same, and this I referred to in my report in that case. To obviate these difficulties he devised a formula conforming to the Knoxville decision for a depreciated rate base which was true irrespective of differing interest rates used for sinking fund and for owner's return and was, therefore, the exact arithmetical equivalent of the pure sinking fund method of table II above. He and assistant engineers in his office also computed elaborate tables for practical use in the application of the method. In that case this method was known as the "Adams or Third Method". Its formula was as follows:

Let A equal the annual contribution to a sinking fund the accumulation of which, together with the accumulations of (r) per cent compound interest thereon, will equal the original investment at the end of (n) years. Contributions made at the end of each year and interest compounded annually.

A^1 equals the annual contribution to a sinking fund the accumulations of which, together with the accumulations of (r) per cent compound interest thereon, will equal the amount of the residual value of the structure (P) at the end of any given year $(n-z)$ at the end of its residual life in years (z) , if contributed each year during the residual life. Contributions made at the end of each year and interest compounded annually.

r equals the rate of interest earned by sinking fund.

n equals useful or expected life in years.

z equals residual life in years.

R equals interest allowed on investment.

P equals percentage value of a structure having a useful life of (n) years at any age $(n-z)$ years.

The Adams method is based upon the principle that the sum of interest return on the residual or depreciated value plus the allowance to offset the annual allowance for a reserve for future replacements shall be equal for each year of the life of any structure under consideration. This relation may be expressed by the equation

$$R + A = P (R + A^1)$$

Solving this equation for P we have

$$P = \frac{R + A}{R + A^1}$$

This equation involves two different sinking fund contributions, A for the first year, and A^1 for any other year. These may be taken from any sinking fund tables. For practical use in computations the calculated decimal factors, which represent the final values of P and which were embodied in tables by Mr. Adams, are indispensably necessary for convenience in computation. In the Contra Costa case the Adams formula was used in calculating the accrued depreciation and annual allowances, 7 and 5 per cent being used for R and r , respectively.

The Contra Costa report has never been printed or published, except for part of the discussion of depreciation by the Master, which was printed in the California Law Review for November, 1916. It cannot be assumed, however, that the results there obtained by Mr. Adams were made known to engineers and others interested except in so far as Mr. Frederick P. Stearns, a witness with Mr. Adams, may have carried the results into the deliberations of the committee of the American Society of Civil Engineers, whose report is referred to on page 35 ante. It is significant, however, that both in the first

report of that committee and in its later final report the contribution of Mr. Adams and the nature of his formula is not referred to. Instead, a table conforming to table III, page 48 ante, was presented in the first report under the name of the Equal Annual Payment Method. In the second report its name was changed to the Compound Interest Method by reason of the fact that it does not produce equal annual payments as does the pure sinking fund method, under all conditions, but only when the rates used for owner's return and for sinking fund contribution were the same. Accordingly in the second report the name was changed to the Compound Interest Method and I have referred to it here as the Modified Sinking Fund Method.

Furthermore, when the next case of major importance was here in this court, that of Spring Valley Water Company vs. City and County of San Francisco, Mr. Metcalf, who was secretary of the engineers' committee referred to, and Mr. Hazen of New York, both distinguished engineers, followed what I have here called the Modified Sinking Fund Method as contrasted with the Straight Line Method of defendant's engineers. It is to be stated that they used their computed results not inexorably but as an aid to their judgment. I decided against the Straight Line Method and approved the method of plaintiff's engineers and adopted their results with some modifications.

My conclusion from the facts that Mr. Adams' collaborator, Mr. Stearns, had in the engineers' committee report abandoned the more exact result of the Adams formula for the more easily applied Compound Interest or Modified Sinking Fund Method, and that Mr. Metcalfe and Mr. Hazen had done the same thing, was that the Adams Method was deemed an unnecessary refinement of exactness, and that the Modified Sinking Fund Method was in the minds of practical men sufficiently accurate for the purpose in hand. Accordingly, in my theoretical discussion in the Spring Valley report, I described the Modified Sinking Fund Method as here and made no mention of the exception that prevails when the interest rates applied are different. For all practical purposes, the distinction between the Adams Method and the Modified Sinking Fund Method passed out of my mind and stayed out during the writing of the report in this case. In the evidence in the present case, Mr. Ellis, for the city, followed the method which had approved itself to me in the Spring Valley case and used a rate of interest for the sinking fund which commended itself to my judgment. The only changes, therefore, which seemed to me necessary in his computations were changes in cost new of various items and in the life estimates. If Mr. Ellis and the Master following him had used the Adams formula, and if the report had sufficiently explained that table III was in all cases, irrespective of interest rates, to be constructed on the basis of the Adams formula, there would be no difference in the results obtained from the results which would have ensued had the straight Sinking Fund Method been employed. It remains to consider what, in view of what I have said, should be the disposition of the objection.

In considering the effect of the use of the Modified Sinking Fund Method instead of the more exact Adams Method, attention must be given, first, to the approximate character of the whole inquiry as to the accrued depreciation (or what I have called the reserve which ought to be on hand) and the annual allowance to be made for future replacements. I have stated in the report (p. 39) that the tables which must be made to illustrate different methods necessarily proceed on assumptions that are not entirely justified by experience. The underlying purpose of the whole calculation is to provide from the rates for replacement in kind of plant units that are destroyed in the service of the public. If we adopt any method which contemplates the formation of a reserve, it is necessary to estimate the lives of the units in service. I have many times referred to the very uncertain character of these life estimates. As to the rating base or value upon which owner's return is calculated, the necessity of table-making requires the undoubtedly false assumption that cost, present reproduction cost and future replacement cost are the same. So far as owner's return is concerned, we have taken reproduction cost at the time of examination, less the reserves which ought prudently to be on hand, as a rate base, on the theory that any owner ought to earn what his property is currently worth, thus to some extent making up for the changing value of the dollar. We have used, however, the same figure in calculating the reserves toward replacements; in other words, we have assumed that the future replacement cost is known and will be the same as replacement cost today. This, of course, is a violent assumption, not likely to prove true. The remedy is in periodical adjustment of the annual allowance to replacement reserves made, let us say, under direction of the state regulatory commission. Such imperfections are inherent in any system which accumulates a reserve in advance, 2026 and the only method of accounting depreciation which avoids these approximations is the replacement method of table I. The point to be emphasized, then, is that the whole matter of depreciation accounting is a matter of approximation like many other things in the whole process of valuation, and that these mathematical methods which I have described and employed are really only aids to judgment. Their results are carried out to the ultimate dollar and cent, and I have adopted results of this specific character. But it must be remembered that I could as well have used round figures, since the whole matter is not exact. It may well be, then, that though I would have taken the results calculated by the Adams Method, which approximates the results of the Modified Sinking Fund Method, but is more nearly exact, if the Adams Method had been used by Mr. Ellis, nevertheless the result finally adopted may not be outside the limit of practical approximation to accuracy. The reason, however, why, even in view of the error which I have pointed out, I have concluded to overrule the objection is that counsel presents nothing which enables me to know whether the error is of critical importance. How am I to know whether a recomputation of the depreciation figures by the Adams Method would have produced such a change in present value and in annual allowances

as would change the result of this case? This is a matter of expert computation which should appear in the evidence, or, at least, as a supplement to the objection. It is not clear to me whether the plaintiff desires that depreciation should be refigured by the replacement method or by the pure sinking fund method, or its equivalent, the Adams Method. There is not even furnished to me the results which would have been attained by the use of the straight Sinking Fund Method, a much simpler computation, which plaintiff has had since August 5, 1919, to present to me. The underlying assumption of counsel's objection appears to be that the Master does all this computation himself. This is not the case. I have adopted Mr. Ellis' results, except for a recomputation of certain items, which was performed personally because of the simplicity of the method and the accessibility of tables. To have computed the results on the thousands of items involved in the inventory by the application of the Adams formula would have taken skilled engineers a great many months and could not have been performed by the Master with any assurance of correct results.

On this ground the objections mentioned are overruled, and
2027 I have extended my remarks at length only that the matter may be fully understood in its theoretical aspects.

With reference to counsel's citation of the case of *Cotting vs. Goddard*, on page 11 of the objections, I may point out to him that the passages cited were not concurred in by the majority of the court.

Objections Nos. 8, 9 and 10 have to do with the valuation of plaintiff's rights under the Jones patents. Plaintiff is incorrect in stating that the Master failed to find the present value of the patent rights. These were allowed in capital value as stated, page 85, at \$46,066.67, the amount paid the grantors in 1915. If the plaintiff had paid the inventors, say \$500,000, or other considerable sum, for these patent rights, there is no reason to doubt that this figure would have been accepted as the valuation for purposes of return. It is not my view that a valuation must follow cost, although it is more apt to do so where the purchase was recently made. I have stated as fully as I could the reasons why I could not find the immensely greater figure which plaintiff claims. Briefly, the evidence was entirely too speculative. There is, after all, in such a policy no particular restriction to enterprise in denying to stockholders the fruits of valuable inventions, because the stockholders do not function in the direction of enterprise. The way to reward enterprise is to pay large sums to inventors, but that is not the question here. In a supplementary argument counsel asks me to apply here the rule which prevails in patent accountings, where, when damages cannot be ascertained by reference to an established royalty, the Master is permitted to determine from all the evidence what would have been a reasonable royalty. The qualification to this rule is, however, that the Master must have some evidence upon which his mind can work and rely, and that is to a large degree lacking here, save in so far as it is given by the amount of the purchase price. The objections named are accordingly overruled.

Objection No. 12 concerns the failure of the Master to find any

value additional to that of its property in general to be attributed to its franchise to occupy the streets with its mains. I stated in the report, for example, at page 98, that there was no substantially different or greater value to a franchise obtained before 1911 than to a franchise obtained after that date. Counsel calls my attention to the decision of the United States Supreme Court in *Los Angeles Gas &*

Electric Co. vs. City of Los Angeles, rendered December 8, 2028 1919, which was not known at the time the draft report was announced. By that decision it was affirmed that a company having pipes in the streets of Los Angeles, under a franchise obtained like the plaintiff's, prior to 1911, could not be forced by the municipality to move its pipes to make way for the pipes of the municipality, which operated a competing plant. It was held that such an order was not in any way an exercise of the police power and that as a competitor the municipality was in the same position as a private company competing with one having the prior location. It appears, therefore, that a franchise antedating 1911 has substantial advantage over a franchise of a later date. It is not plain to me, however, how this difference can be capitalized. It would appear to me that if the plaintiff could be properly compelled by a municipality to change the location of its pipes by virtue either of the police power or of some terms in its franchise, it would be entitled to add that expense to its operating charges, and thus raise the cost of gas service. The situation is that plaintiff will not be subjected to this expense, but in the meantime it does not appear why it should for that reason be allowed to charge more for its gas. If a competitor should now come in and accept a franchise which would allow the municipality to change the location of its pipes, and should in fact have incurred expense on this account, then the expense of that competitor's service would increase and its profits be diminished. If the rate were fixed by public authority on the basis of the competitor's costs, then plaintiff's net profits would presumably increase on the basis of the common rate established and there would be no need to consider a valuation of franchise. If it were fixed on the basis of plaintiff's lesser costs, then obviously, the competitor would suffer and possibly unjustly. But that question is not before us.

When plaintiff's counsel says, at page 33 of the objections, that the Master's report in effect results "in taking from the plaintiff and giving to its consumers the benefit of all economies and savings in the matter of administrative expense effected by the plaintiff through the operation of its San Francisco gas properties and business in connection with its other properties and business, and also the benefit of the economies and savings effected by plaintiff by its acquisition and use of the patent rights hereinbefore mentioned," there is pointed out one respect in which the law on this subject-matter as administered by the courts seems to work injustice. It is not clear, 2029 however, that it works confiscation within the meaning of the constitution and the decisions upon the subject-matter. An administrative board fixing rates ought to consider such matters as this and make allowances therefor. But I know of no way in which

a court may do so, and if the situation can be solved, it must be solved by wiser heads than mine.

I have, accordingly, in response to plaintiff's objections, made at various points in the draft report marginal notes correcting some of the errors referred to, but I see no reason to change the final result. Accordingly, plaintiff's objections are all overruled.

The objections of the city are ten in number. The first objection refers to the failure of the Master to exclude from the value of complainant's property for the year 1915-16 the sum of \$12,180, representing the value of the lands owned by the plaintiff situated at Martin Station. The objection is well taken. The structural properties at Martin Station were excluded from the valuation in the last year by reason of the abandonment of the station, and by oversight the value of the land was not deducted. While I grant the exception, I shall make no change in the report, for the simple reason that it is not necessary, in view of the result.

Objections 2 to 8 concern matter which has been fully considered, and the objections are overruled without further comment.

Objection 9 is to the failure of the Master to include in the conclusions to the report at page 138 a conclusion that the defendant is entitled to the payment for its own use and benefit of such damages as may have been incurred by reason of the temporary restraining order heretofore issued. With this objection there is submitted to me an affidavit by Mr. Ellis of total costs and expense incurred by the city in the litigation amounting to \$26,057.96, of which \$1,878.50 is taxable under the rules, and \$24,179.46 is not taxable as costs. I am requested by counsel to transmit this affidavit to the District Court. The total expense, including the non-taxable costs, is conceived of by the city as its damages under the restraining order issued, a conclusion which may be questionable, in view of the fact that, apparently, the same expenses would have been incurred if the case had been tried without any restraining order having been issued. However, I do not pass on the matter, since I do not conceive it is within the order of reference. I have not included any recommendation, for the reason that it seemed obvious. However, the conclusion No. 2 on page 138 of the report will be modified to meet objection 9 and also objection 10. At present it reads as follows:

2030 "2. That defendant should have decrees in its favor that the bills of complaint herein should be dismissed with costs to defendant city, and with such provisions for the return by plaintiff to its consumers during those years of charges over the rates fixed by the ordinance as to the court shall seem proper."

This paragraph will be omitted and the following paragraphs inserted instead thereof:

"2. That defendant should have decrees in its favor that the bills of complaint herein should be dismissed with costs to defendant city, together with such damages as may have been incurred or suffered by reason of the temporary restraining order heretofore issued

in this court, to be paid to the City and County of San Francisco for its own use and benefit.

"3. That said decrees should also provide that the plaintiff should be directed to return to its consumers all charges in excess of the ordinance rates collected between the first day of July, 1913, and the 29th day of October, 1917, together with interest thereon at the rate of seven per cent from the dates of such collections."

With the changes in this supplemental report noted, the foregoing draft report, with this supplemental report, is hereby settled, signed and filed as my final report herein this 2d day of March, 1920.

H. M. WRIGHT,
Master in Chancery.

APPENDIX I.

City's Deductions from Plaintiff's Operating Expense Statement—Allowed or Disallowed.

	1913-14.		1914-15.		1915-16.	
	Allowed.	Disallowed.	Allowed.	Disallowed.	Allowed.	Disallowed.
Maint. Gen Capital.....	\$1,800.00	.....	\$1,114.08	.....	\$794.82	.....
Maint. Tr. Capital.....	468.00	.....	.....	375.00	.....	.....
Maint. Distr. Capital.....	6,299.81	\$32.40	52.20	.....	335.68	129.06
.....	.....	.....	.....	.....	50.53	57.55
.....	.....	.....	.....	.....	.....	35.93
.....	.....	.....	.....	.....	.....	115.72
.....	.....	.....	.....	.....	.....	30.01
.....	.....	.....	.....	.....	.....	70.49
.....	.....	.....	.....	.....	.....	245.58
.....	.....	.....	.....	.....	.....	128.59
.....
.....	.....	.....	474.75	.....	422.42	.....
.....	.....	.....	.....	.....	168.52	.....
.....	.....	.....	23,700.15	1,412.33	24,089.30	141.58
.....	.....	943.84	496.47	779.50	949.14	1,968.29
.....	.....	523.80	.....	.....	.....	.....
.....	.....	112.84	.....	.....	63.00	.....
Generating Expense .....	.....	.....	.....	.....	.....	.....
Trans. Expense	637.40	.....	.....	.....	.....	.....
Distr. Expense	14,842.20	943.84	23,700.15	1,412.33	24,089.30	141.58
.....	669.55	523.80	496.47	779.50	949.14	1,968.29
.....	.....	112.84	.....	.....	63.00	.....

.....	272.69	.....	1,104.95	310.00	.....
1,420.78	.....	2,220.86	.....	2,899.65	.....
1,429.61	.....	.....	.....	815.13	.....
20,663.48	.....	24,818.68	.....	5,547.00	.....
979.96	1,539.47	2,263.98	.....	2,945.36	.....
General and Administration Expense	41,037.76	23,178.61	26,863.61	36,310.39	9,435.53
Total Deductions	\$90,248.55	\$26,603.65	\$30,595.45	\$75,700.94	\$12,358.33

Summary—Total Expenses Allowed.

Total Exp. Exh. 108	\$2,122,174.66	\$2,264,756.97	\$2,269,304.43
Less Deductions Allowed	90,248.55	95,825.60	75,700.94
Total Exp. Allowed	\$2,031,926.11	\$2,168,931.37	\$2,193,603.49

Adv. Financial	1,975.75	.....	4,805.23	.....	403.50	.....
Maps, etc.	200.00	710.80	.....	26.41	.....	48.32
Nat. El. Lt. Ass'n. ....	.....	968.07	675.00	1,913.64	.....	8,268.28
Donations and Subscriptions..	75.00	50.00	1,171.20	4,231.67	105.00	100.00
Entertainment .....	.....	.....	.....	.....	648.61	3,089.04
Panama-Pac. Exp.	112.75	1,566.01	.....	.....	.....	.....
Pioda, etc. ....	.....	20,200.00	.....	20,200.00	.....	.....
Misc. Exp.	318.68	7,962.32	.....	17,604.19	.....	.....
.....	283.80	.....	11,627.93	10.00	.....	.....
.....	.....	.....	.....	12.00	.....	.....
.....	2,091.01	.....	.....	25.00	.....	.....
.....	.....	.....	1,026.80	693.45	.....	.....
.....	.....	.....	.....	105.00	.....	.....
.....	.....	.....	.....	43.10	.....	.....
Auditor's Payroll .....	.....	4,000.00	.....	9,095.20	.....	.....
.....	.....	.....	.....	6,639.00	.....	.....
J. G. White & Co.	131.42	.....	.....	1,718.75	.....	.....
.....	285.35	20,305.58	407.57	16,619.17	54.20	.....
.....	189.60	.....	316.86	1,563.91	.....	.....
.....	300.97	.....	.....	.....	.....	.....
.....	475.00	.....	.....	.....	.....	.....
.....	82.17	.....	.....	.....	.....	.....
.....	355.00	.....	.....	.....	.....	.....
Am. Eng Co. ....	.....	1,575.00	.....	.....	.....	.....

Detail of City's Deductions.—Continued.

	1913-14.		1914-15.		1915-16.	
	Allowed.	Disallowed.	Allowed.	Disallowed.	Allowed.	Disallowed.
2034 Telephone Expense	19,049.10	.....	21,042.67	.....	19,531.40
	2,530.84
R. R. Transportation	2,976.31	.....	.....	.....	128.04
	3,511.18
Strike Expense	775.02
Detective Service	17,145.65	.....	8,616.80	.....	.....
Auto Exp. Elec. Dept.	3,464.73	.....	.....	.....	.....
Price W. Co.	4,107.12	.....	2,719.07	.....	2,532.20	.....
N. Cal. Water Ass'n.	500.00	698.94	.....	690.12	.....	.....
Cash Shortage
Sundries	348.31	.....	16.10	.....	.....
	602.47	65.50	2,000.00	230.81	.....
	78.50	18.50	100.00	.....
	26.00	109.45	21.06	.....
	69.35	.....	86.40	.....
	382.12	.....	.....	.....
Freight Claims Paid	631.47	.....
Exchange	252.30	.....	55.30	.....
San Rafael Expense	481.17	.....
	37.50	.....
Total	\$36,221.07	\$104,408.13	\$46,970.91	\$120,158.58	\$39,852.14	\$43,872.66

2035

APPENDIX III.

Summary—General and Administrative Expense.

1913-14 See Ex. 85, p. 2 <i>b</i>	\$544,915.48	
Less deductions allowed.....	36,221.07	
	<hr/>	
	\$508,694.41	
508,694.41 \times 22.2 =.....		\$112,930.16
See 85 2- <i>b</i>		5,737.58
“.....		2,669.84
“.....		7.06
	<hr/>	
S. F. Gas prop'n Gen'l & Adm.....		\$121,344.64
Ex. 108.....	\$162,382.40	
	\$121,344.64	
	<hr/>	
Deduction		
allowed .	\$41,037.76	
City's deduction.....		\$64,216.37
		41,037.76
	<hr/>	
Deduction disallowed..	\$23,178.61	
1914-15 See Exh. 86 2- <i>b</i>	\$600,991.99	
Less deductions allowed.....	46,970.91	
	<hr/>	
	\$554,021.08	
554,021.08 \times 22.305% =.....		\$123,574.40
See Exh. 86 2- <i>b</i>		7,921.98
“.....		3,027.63
	<hr/>	
S. F. Gas prop'n Gen'l & Adm.....		\$134,524.01
Ex. 108.....	\$177,436.60	
	134,524.01	
	<hr/>	
Deduction		
allowed .	\$42,912.59	
City's deduction.....		\$69,776.20
		42,912.59
	<hr/>	
Deduction not allowed.	\$26,963.61	
2036		
1915-16 See Exh. 87 2- <i>b</i>	\$541,449.94	
Less deductions allowed.....	39,852.14	
	<hr/>	
	\$501,597.80	

501,597.80 \times 21.916% =	\$109,930.17
See Exh. 87 2-b	7,367.22
"	3,463.92
"	312.49

S. F. Gas prop'n Gen'l & Adm.	\$121,073.80
Ex. 108	\$157,384.19
	121,073.80

Deduction allowed ..	\$36,310.39
City's deduction	\$45,745.92
	\$36,310.39

Deduction not allowed.	\$9,435.53
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2039½

VOLUME 8.

2040 In the District Court of the United States in the Southern
Division of the Northern District of California, Second
Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

*Objections to Draft Report of Standing Master in Chancery on Final
Hearing.*

To Hon. H. M. Wright, Standing Master in Chancery:

Pacific Gas and Electric Company, plaintiff in the above entitled suits, objects to your draft report dated December 15, 1919, in said suits and specifies the particular findings of fact and conclusions of law in said report to which it objects and the grounds of its objections to such findings and conclusions respectively as follows, viz:

I.

Objections to Finding of Fact and Conclusions of Law with Respect to Reproduction Cost of Plaintiff's Structural Property as of June 30, 1914.

Objection No. 1.—Plaintiff objects to the finding of fact shown on pages 16 and 17 of said draft report that the entire amount
2041 of administrative and legal expenses and taxes and interest during construction, entering into and constituting a part of the necessary reproduction cost of plaintiff's structural property which was included in E. C. Jones' appraisal and was actually in use and useful on June 30, 1914, in supplying the City and County of

San Francisco and its inhabitants with gas was only the sum of the following items, viz:

(a) For administrative and legal expenses and taxes.	\$211,009.13
(b) Interest during construction.....	395,022.26
	<hr/>
	\$606,031.39

Objection No. 2.—Plaintiff objects to the finding of fact shown on page 17 of said report that the total reproduction cost of the aforesaid structural property as of June 30, 1914, was only the sum of \$13,719,400.04.

Objection No. 3.—Plaintiff objects to all subsequent findings of fact in said report which are based upon and affected by the aforesaid finding to the effect that the value of said structural property as of June 30, 1914, was only the sum of \$13,719,400.04, to the extent to which such subsequent findings involve the error to which said Objection No. 2 is directed.

Objections Nos. 1, 2 and 3 are made upon the ground that it is shown by a fair preponderance of the evidence that the amount of the administrative and legal expenses, taxes and interest during construction entering into and constituting a part of the necessary reproduction cost of plaintiff's aforesaid structural property is, as shown by plaintiff's Exhibit No. 4, the sum of \$906,542.25, and that the total reproduction cost of said structural property as of June 30, 1914, was, as shown in plaintiff's Exhibit No. 5, the sum of \$14,021,230.68.

2042 Objection No. 4.—Plaintiff objects to the mixed finding of fact and conclusion of law, as shown on pages 27 to 31 of said draft report, that the sum of \$612,931.61, being a part of the estimated cost of cutting and relaying existing pavement included in the reproduction cost of plaintiff's gas distribution system in the City and County of San Francisco should be deducted and excluded from the reproduction cost of plaintiff's aforesaid structural property, because said sum of \$612,931.61 represents the estimated cost of cutting and relaying over gas mains and pipes certain pavement which is not shown by the evidence to have been laid before the laying of the gas mains and pipes now covered thereby and which consequently is not shown to have entered into the actual historical cost of plaintiff's existing gas distribution system.

The grounds of plaintiff's objection No. 4 are as follows:

(a) The reproduction cost of plaintiff's gas distribution system necessarily includes the item excluded by the finding of fact mentioned in said objection;

(b) The exclusion of said item is inconsistent with the principles of law and economics upon which the reproduction cost of plaintiff's aforesaid structural property devoted to public service is con-

sidered in determining the present value of such property, the reasonable cost to the plaintiff of producing and distributing gas and consequently the reasonableness of the gas rates which plaintiff contends are so low as to involve confiscation;

(c) It is necessary that this item should be included in the reproduction cost of plaintiff's aforesaid structural property when used as a basis for determining proper and reasonable annual allowances for accruing depreciation;

2043 (d) In any event justice and equity require that the cost of pavement not laid by plaintiff's predecessors in estate, but actually existing at the time when plaintiff acquired control thereof through the purchase of the stock of the San Francisco Gas and Electric Company on January 2, 1906, and therefore presumptively included in the purchase price which was paid by plaintiff, should be included in the reproduction cost of the aforesaid structural property, the amount of such cost being conceded by the defendants and found by the Master to be the sum of \$325,000.00 plus \$9,750.00, being three per cent interest thereon, or in the aggregate the sum of \$334,750.00; and

(e) Pavement over mains is a concomitant of dense population, lofty buildings and great public demand in limited areas for gas and thus sustains an obvious relation to the present value of a gas distribution system considered as a part of a plant in actual operation and constituting a going concern.

II.

Objections to Findings of Fact and Conclusions of Law with Respect to the Amount of Accrued Depreciation on Structural Property and Annual Allowances for Depreciation Chargeable as Part of the Cost of the Production and Distribution of Gas.

Objection No. 5.—Plaintiff objects to the finding of fact shown on page 67 of said draft report "that the Modified Sinking Fund Method is in all respects the equivalent of the Sinking Fund Method."

The ground of Objection No. 5 is that this finding is erroneous, the two methods not being equivalent unless the rate per cent used in determining the annual allowance for depreciation is the same as the rate per cent used in determining the reasonable return upon the present value or reproduction cost used as the rating base.

2044 The error in this finding is clearly shown by a comparison of Tables II and III on pages 44 and 48 of said draft report with the following tables:

Table A.—Second or Sinking Fund Method.

(6% on Fund and 8% as Owner's Return on Rating Base.)

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Annual total of sinking fund.	Earnings, sinking fund.	Owner's return.	Total rate payers' payment (3 plus 5).
1.....	100,000	7,587	.....	8,000	15,587
2.....	100,000	7,587	(455)	8,000	15,587
3.....	100,000	7,587	(938)	8,000	15,587
4.....	100,000	7,587	(1,449)	8,000	15,587
5.....	100,000	7,587	(1,991)	8,000	15,587
6.....	100,000	7,587	(2,566)	8,000	15,587
7.....	100,000	7,587	(3,175)	8,000	15,587
8.....	100,000	7,587	(3,821)	8,000	15,587
9.....	100,000	7,587	(4,505)	8,000	15,587
10.....	100,000	7,587	(5,230)	8,000	15,587
2045		75,870	(24,130)	80,000	155,870

Table B.—Modified Sinking Fund or Compound Interest Method.

(6% on Fund and 8% as Owner's Return on Rating Base.)

(1)	(2)	(3)	(4)	(5)	(6)
Year.	Rating base.	Annual total of S. F.	Earnings, sinking fund.	Owner's return.	Total rate payers' payment (3 plus 5).
1.....	100,000	7,587	.....	8,000	15,587
2.....	92,413	8,042	(455)	7,393	15,435
3.....	84,371	8,524	(938)	6,750	15,274
4.....	75,847	9,036	(1,449)	6,068	15,104
5.....	66,811	9,578	(1,991)	5,345	14,923
6.....	57,233	10,153	(2,566)	4,579	14,732
7.....	47,080	10,762	(3,175)	3,766	14,528
8.....	36,318	11,408	(3,821)	2,905	14,313
9.....	24,910	12,092	(4,505)	1,993	14,085
10.....	12,818	12,818	(5,230)	1,025	13,843
	0}	100,000	(24,130)	47,824	147,824
11.....	100,000	7,587	.....	8,000	15,587

Objection No. 6.—Plaintiff objects to the mixed finding of fact and conclusion of law implied in the statement in the second paragraph of page 75 of said draft report, viz: "Accordingly, I shall determine the present value of plaintiff's plant and the reasonable annual allowance to reserve by the modified sinking fund method, including

in the factors which have influenced the existing depreciation—the reserves which ought to be on hand—the effects of obsolescence and inadequacy as well as of physical deterioration.” The finding so implied is, in effect, that it is just and equitable to determine the present value of plaintiff’s aforesaid structural property and the reasonable annual allowances to be made to the plaintiff for accruing depreciation of such property caused by wear, physical deterioration, inadequacy and obsolescence all combined, by the application of the so-called Modified Sinking Fund Method as distinguished from the pure Sinking Fund Method.

The grounds of objection No. 6 are as follows, viz:

(a) The implied finding specified in objection No. 6 involves the same error as that which exists in the finding of fact to which exception is taken in Objection No. 5;

(b) This implied finding fails to make the natural and necessary distinction between (1) depreciation caused by gradual wear and gradual physical deterioration resulting from use and the known action of the elements, and (2) depreciation which results from causes fortuitous in their nature which include new inventions and discoveries resulting in obsolescence and changes in population and business resulting in inadequacy. Depreciation resulting from gradual wear and gradual physical deterioration caused by use and the known action of the elements actually sustains a reasonably definite relation to the lapse of time when the use is fairly constant and maintenance is not neglected; and, with respect to structures and apparatus subject chiefly to this kind of depreciation, it is possible for men possessed of sufficient experience to predicate with reasonable accuracy a definite life expectancy. But it is obvious that depreciation resulting from causes of a fortuitous nature does not progress or occur in any definite relation to the lapse of time; and that, with respect to structures and apparatus subject to such depreciation as results from the operation of fortuitous causes alone or in combination with gradual wear and gradual physical deterioration, it is impossible for any person, however great may be his experience, to predicate a definite life expectancy. If the fortuitous causes occur, the corresponding depreciation results. If the fortuitous causes do not occur, there is no resulting depreciation. Provision for replacement of structures and apparatus subject to depreciation which results from fortuitous causes alone or in combination with gradual wear and gradual physical deterioration should be made, not in accordance with the principles of life insurance, but rather in accordance with the principles of casualty insurance or a combination of such principles; and annual allowances out of earnings for depreciation resulting from fortuitous causes should be deemed to be compensation for risks carried by the owner and should not be deducted from cost of reproduction in determining present value.

(c) This implied finding, so far at least as it applies to the determination of the present value of plaintiff’s structural property,

is in conflict with the uncontradicted testimony of Mr. E. C. Jones with respect to the nature, use and present condition of by far the major part of plaintiff's aforesaid structural property.

Objection No. 7.—Plaintiff objects to each of the following findings of fact shown on page 79 of said draft report viz:

(1) The amount of the existing depreciation which ought to be deducted from the average reproduction cost in order to ascertain the present value of plaintiff's said structural property was, for the year 1913-14, the sum of \$1,518,390.00, for the year 1914-15, \$1,780,411.00, and for the year 1915-16, \$1,493,162.00; and

(2) The proper annual allowance for accruing depreciation of plaintiff's said structural property was for the year 1913-14 the sum of \$348,853.00, for the year 1914-15 the sum of \$372,680.00, and for the year 1915-16, the sum of \$380,519.00.

2048 The grounds of Objection No. 7 are as follows, viz:

(a) For the purpose of computing the proper annual allowance for depreciation for each of the three years from July 1, 1913, to June 30, 1916, the average reproduction cost of plaintiff's structural property should be increased by the sum of \$616,931.61, being the item of cost of certain pavement laid subsequent to the laying of plaintiff's mains which item was excluded from the total reproduction cost of plaintiff's structural property by the Master's findings shown on pages 27 to 31 and 33 of said draft report. It clearly appears from the evidence that the existence of this pavement over mains will necessarily increase the cost of replacement of mains and pipes covered thereby to the same extent as if it had actually been laid and paid for by the plaintiff.

(b) The so-called Modified Sinking Fund Method is unjust and inequitable in this respect, viz., that its application necessarily results in placing the owner of property devoted to public use in the same position, so far as his right to receive compensation for the use thereof is concerned, as if he were compelled by law to keep the entire amount of his original investment continuously devoted to public use and subject to the risks of his business, and were at the same time permitted to earn upon that part of his investment required to be kept in a depreciation reserve only the comparatively low rate of return used in computing by sinking fund methods the accruals upon such reserve.

(c) Said pure Sinking Fund Method may justly and equitably be employed in determining annual allowances for accruing depreciation whenever it is based upon reasonably correct hypotheses as to the ages and probable lives of structures and apparatus whose depreciation results primarily and chiefly from gradual wear
2049 and gradual physical deterioration as the result of use and known action of the elements, provided full reproduction value be used as the rating base. But, if this method or any modification thereof be employed in determining the present value of structures

and apparatus which under existing conditions of use are but slightly or not at all subject either to gradual wear or to gradual physical deterioration but will endure without loss of efficiency or utility until, as the result of some fortuitous cause, they shall become inadequate, obsolete or useless, then it is necessary to correct the results obtained by its use by considering from time to time the present condition of such structures and apparatus and ascertaining whether or not such causes have actually occurred and resulted in depreciation.

(d) For the reasons already set forth the annual allowances for depreciation of plaintiff's aforesaid structural property should be computed in accordance with the pure Sinking Fund Method and the results so obtained substituted for those given on page 79 of said draft report, and the reproduction value or cost of reproduction new should be used in making up the rating base.

(e) If the ultimate question to be determined in this case is whether or not the rate of eighty-five (85) cents per thousand cubic feet is a just and reasonable maximum rate to be charged by plaintiff for supplying gas to the City and County of San Francisco and its inhabitants, or, in other words, whether or not that rate, under all the facts in the case, constitutes just compensation for the commodity furnished and service rendered to the public by the plaintiff, then there is nothing in any of the decisions of the Supreme Court of the United States which precludes the use of the pure sinking fund method in determining the annual allowances for depreciation and the use of the so-called reproduction value as the rating base in determining one of the elements entering into the reasonable 2050 cost of the commodity furnished and service rendered. In this connection the plaintiff relies upon the following cases in support of its contention that the ultimate question is the one stated above, viz:

Smyth v. Ames, 169 U. S. 466, 523, 540-2, 546-7;
Cotting v. Godard, 183 U. S. 79, 86-98;
Minnesota Rate Cases, 230 U. S. 352;
Northern Pac. Ry. Co. v. North Dakota, 236 U. S. 585;

The decisions of the United States Supreme Court, in Knoxville v. Knoxville Water Company, 212 U. S. 1, and the Minnesota Rate Cases, 230 U. S. 352, to the effect that present value, not original cost, is the criterion in passing upon the question whether given rates are reasonable or confiscatory, are not necessarily inconsistent with the position here taken because the use of the criterion employed in weighing the effect of the evidence before the Court in those cases does not preclude the use of a different criterion in determining the effect of different evidence bearing upon the question whether or not given rates are just and reasonable. The criterion here proposed, by eliminating present value as an element in the problem, avoids the circular reasoning which is inherent in every attempt to judge of the reasonableness of rates by their relation to present value which, in accordance with the principles of economics, is measured by earning power. The solution of the problem offered on behalf of the plaintiff is essentially a comparison of the given rates with the

cost of furnishing the commodity or service by means of a comparative plant or system such as the public, if so inclined, might construct and operate under present day conditions for its own service.

(f) But, if the Master adheres to his opinion that present value should be used as the rating base, then it is respectfully submitted that, inasmuch as his estimates of the life expectancy of the several units of plaintiff's structural property is based in part upon gradual wear and physical deterioration and in part on probable inadequacy and obsolescence which has not yet occurred, he should, in determining present value, correct the results reached by the application of that method so as to make such results conform to the facts shown by the testimony. The true Equal Annual Payment Method, otherwise called the "Adams Third Method," would probably be more nearly equitable than the Modified Sinking Fund Method.

(g) The findings to which exception is taken in Objection No. 7, so far as they relate to the present value of plaintiff's aforesaid structural properties and the amount of accrued depreciation for the period from July 1, 1913, to June 30, 1916, are not sustained by the evidence which without substantial conflict shows that the amount of accrued depreciation at June 30, 1914, did not exceed the sum of \$828,916.41 as set forth in plaintiff's Exhibit No. 43, and should be corrected accordingly.

III.

Objections to That Part of the Master's said Draft Report Which Deals with Patent Rights, viz., the Part Contained on Pages 84 to 87 of said Report.

Objection No. 8.—Plaintiff objects to the Master's failure to find the present value of plaintiff's patent rights which are described and discussed on pages 84 to 87 of said draft report and his failure to include such value in his subsequent finding as to the present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants during the period beginning July 1, 1913, and ending June 30, 1916.

Objection No. 9.—Plaintiff objects to the Master's failure to find that plaintiff is legally and equitably entitled to the savings in the manufacture of gas effected by its use of the apparatus and process invented by E. C. Jones and Leon B. Jones and protected by the patents described on page 84 of said draft report, in addition to a reasonable return upon its property necessarily and properly used in supplying gas to said City and County of San Francisco and its inhabitants exclusive of said patent rights.

Objection No. 10.—Plaintiff objects to the Master's finding shown on page 86 of said draft report to the effect that the savings attributed by the plaintiff to the use of the aforesaid patented apparatus and

process were due in part to economies incident to the production of larger quantities of gas.

The grounds of Objections Nos. 8, 9 and 10 are as follows:

(a) The evidence introduced by plaintiff was sufficient to justify and compel a finding that the savings in cost of production of gas attributable exclusively to the employment by plaintiff of the apparatus and process protected by said patents were, during the year 1913-14., not less than \$103,530.00, during the year 1914-15 not less than the sum of \$132,419.00, and during the year 1915-16 not less than the sum of \$258,557.00; and that the plaintiff was entitled to retain the entire amount of such savings and to apply them to the amortization of the cost of apparatus abandoned and to be abandoned by reason of the obsolescence resulting from the inventions protected by said patents.

(b) The evidence introduced by the plaintiff upon this subject was sufficient to justify and to compel a finding that the rights possessed by the plaintiff, under and by virtue of its implied and express grants of the right to use the apparatus and process protected by the aforesaid patents, were, during the entire period from July 1, 1913, to June 30, 1916, reasonably worth not less than the sum of \$1,679,472.00. This sum is fifty per cent. of the difference between the present value of the savings to be effected during the life of said patents by the use of the apparatus and process protected thereby, which is \$4,203,300.00, and the net loss resulting from actual and anticipated abandonments of apparatus rendered obsolete by the inventions protected by said patents which is \$844,355.00. See plaintiff's exhibits Nos. 67 and 77, and argument volume 3 page 178. An equal division of net savings between the plaintiff and its consumers is certainly fair to the latter.

(c) The natural and necessary result of the Master's failure either to find the present value of plaintiff's aforesaid patent rights and include such value in the total present value of plaintiff's property or to find that plaintiff was entitled to receive and retain for its own use, in addition to a reasonable return upon its aforesaid property exclusive of patent rights, the amount of the savings actually effected exclusively by its use of the inventions protected by said patents and the apparatus and process embodying such inventions is to deprive the plaintiff of the entire use and benefit of its aforesaid patent rights during the period from July 1, 1913, to June 30, 1916, without any compensation whatever.

IV.

Objections to Finding of Fact Concerning "Going Value."

Objection No. 11.—Plaintiff objects to the Master's finding of fact set forth on page 95 of said draft report to the effect that, during the entire period from July 1, 1913, to June 30, 1916, the additional

value of plaintiff's property used and useful in supplying gas
2054 to the City and County of San Francisco and its inhabitants
when viewed as a going concern and in connection with the
established business conducted by means thereof was the sum of
\$1,500,000.00 and no more.

The grounds of Objection No. 11 are as follows:

(c) Said finding with respect to "going value" is not sustained by the evidence.

(b) The uncontradicted evidence introduced by plaintiff justifies and indeed compels the conclusion that the so-called "going value" of plaintiff's aforesaid property was, during the entire period from July 1, 1913, to June 30, 1916, not less than the sum of \$3,000,000.00.

(c) The aforesaid finding with respect to "going value" is essentially arbitrary because it is not supported by the evidence, but, on the contrary, clearly appears by the statement made on page 95 of said draft report to have been made in deference to what the Master conceived to be the meaning and effect of the opinion of Hon. Frank H. Rudkin rendered in passing upon the Master's report in the case of Spring Valley Water Company v. City and County of San Francisco, 252 Fed. 979, 985-6. The real ground upon which Judge Rudkin reduced the Master's estimate of "going value" in the Spring Valley Water Company's case is, if I correctly understand his opinion, that it sufficiently appeared by the evidence in that case that Spring Valley Water Company had theretofore obtained in its rates a return upon its properties acquired in anticipation of future requirements before their actual use, and that, while the present value of that company's property was not dependent upon its past practices, nevertheless such past practices ought, under the circumstances of that case, to be taken into consideration in determining what
2055 sum should be allowed as "going value." The difference between the state of facts upon which Judge Rudkin based his opinion in the Spring Valley Case and the facts shown by the evidence in these cases makes the opinion of Judge Rudkin in the former case inapplicable here. At this point I desire to emphasize that the particular issue which the Master is here called upon to determine is an issue of fact which should be determined in accordance with the evidence and not as if it were an issue of law upon which the opinion of the Court is deemed to be controlling.

(d) The cost of development, which is the basis upon which the so-called reproduction value of a going concern or established business is ascertained, is naturally and necessarily very different in the case of the business involved in the above entitled suits, namely, the manufacture, distribution and sale of gas to the public, than in the case of the business under consideration in the Spring Valley Water Company's case. For, in the case of the gas business, the proprietor encounters in the development of his business competition with other illuminants and with other fuels and, in order to develop and increase

his business, must avail himself of new and improved methods of utilizing his product for light and fuel purposes and incur large expense in demonstrating to consumers the utility and efficiency of the gas which he produces, while the proprietor of water works used to supply the domestic and industrial requirements of the population of such a city as San Francisco is practically without competition and, because the commodity which he furnishes is a primary necessity is not subjected to an expense in the development of his business comparable to that which must be incurred by the proprietor of a gas manufacturing and distribution system.

2056 (e) The Master, in that part of his said draft report which treats of "going value" does not consider or give any effect to the testimony summarized in the memorandum contained in the supplement to the closing argument of counsel for plaintiff. (See argument pages 980 et seq.) The testimony here referred to shows that, on the basis of the price paid by plaintiff for the stock of the San Francisco Gas and Electric Company on January 2, 1906, the cost to plaintiff of intangible elements of the gas properties then owned by the San Francisco Gas and Electric Company, consisting principally of the elements designated as going concern and franchises, was the sum of \$3,745,301.88; (see argument page 984); and that plaintiff subsequently paid the sum of \$641,754.21 for the elements of going concern and franchise acquired from Metropolitan Gas Corporation. (See argument page 986). The total direct or purchase cost to plaintiff of the aforesaid intangible elements of its gas properties in San Francisco is, therefore, the sum of \$4,387,056.09. Furthermore the cost to plaintiff of restoring and building up its gas business from April, 1906, to the end of December, 1916, exceeded the sum of \$2,000,000.00. (See argument pages 982, 995, 996 and 997).

V.

Objection to Mixed Finding of Fact and Conclusion of Law with Respect to the Value of Plaintiff's Franchise or Right to Use the Public Streets by Virtue of the Grant Made by Section 19 of Article XI of the Constitution of California Prior to the Amendment of That Section on October 10, 1911.

Objection No. 12.—Plaintiff objects to the mixed finding of fact and conclusion of law shown in the last paragraph on page 98 of said draft report, "that plaintiff's franchise has no separate or additional value beyond the sum of the values of its physical property, 2057 together with its going value already recognized in the foregoing appraisement."

The ground of Objection No. 12 are as follows:

(a) Under and by virtue of the provisions of section 19 of article XI of the constitution of California prior to its amendment October 10, 1911, as construed by the Supreme Court of the United States in *Russell v. Sebastian*, 223 U. S. 195, the plaintiff's franchise or right

to use the public streets for the purpose of laying therein pipes and conduits and connections therewith, so far as necessary for supplying the City and County of San Francisco and its inhabitants with light, extends to all of the public streets and thoroughfares in said City and County of San Francisco, whether or not occupied at present by its gas distribution system. Such being the law with respect to said franchise, it seems impossible to consider the franchise as merely an attribute of a gas distribution system laid in the streets under the authority of such a franchise. A gas company having acquired a franchise under said section of the constitution prior to October 10, 1911, by the construction of a gas distribution system in only a small part of the City and County would have the right to extend its distribution system throughout the entire City and County.

(b) It being settled by the decision of the United States District Court in the case of Los Angeles Gas and Electric Company v. City of Los Angeles, 241 Fed. 912, and the decision of the United States Supreme Court rendered December 8, 1919, affirming said decision, that a gas company, being the owner of a franchise granted by said section of the constitution, possesses by virtue of priority of location a right to maintain its gas mains and pipes in their original location as against even the municipality itself considered as a competitor in the gas business, it is obvious, in view of the evidence in these cases, that the plaintiff, by virtue of its having located its gas mains and pipes in favorable positions in the streets, has acquired and possesses a special advantage of position or location which undoubtedly makes its franchise have a peculiar value substantially in excess of the value of a corresponding franchise which might have been obtained by a competitor entering the field after the location and construction of plaintiff's existing distribution system.

(c) Said finding with respect to plaintiff's said franchise is in conflict with the evidence adduced by the plaintiff and summarized by the Master on pages 95 to 101 of said draft report.

(d) Said finding with respect to said franchise is in conflict with the evidence introduced by plaintiff with respect to the cost to it of acquiring the gas properties of its predecessors, the San Francisco Gas and Electric Company and the Metropolitan Gas Corporation, in said City and County of San Francisco, including the going concern and established business and franchises theretofore possessed by its said predecessors. The evidence here referred to is summarized in the memorandum contained in the supplement to the closing argument of counsel for plaintiff. (See argument, pages 980 et seq., particularly pages 984-6.) The evidence here referred to is, when properly considered, quite as cogent as that upon which the United States Supreme Court, in the case of Wilcox v. Consolidated Gas Company of New York, 212 U. S. 19, sustained a finding of the trial court placing a very substantial value upon the Consolidated Gas Company's franchise of using public streets as a right of way in which to lay its gas distribution system, and is sufficient to justify

2059 a finding that the value of plaintiff's going concern or established business and franchises, considered together, is at least the sum of \$4,387,056.00.

(e) Ordinance No. 2489 (N. S.) referred to on page 97 of said draft report and copied in full in defendants' Exhibit No. 96, is not justly entitled to the weight which the Master has given to it as evidence in this case, because said ordinance is of doubtful validity (see Opinions of former City Attorney Hon. Franklin K. Lane, pages 696, 697), because the franchise offered by said ordinance is not comparable with the franchise granted by the aforesaid section of the constitution, and because, even if said ordinance were undoubtedly valid and if the franchise offered thereby were comparable with the franchise granted by said section of the constitution, the advantage of position possessed by the plaintiff by virtue of the prior location of its gas distribution system in the public streets is sufficient, when considered in connection with the evidence relating to the cost to plaintiff of its going concern and franchises and the reproduction value of its going concern, to justify a finding that the value of said franchise is the sum of \$1,476,000.00 which is the value assigned by plaintiff to its said franchise. The advantage of position arising out of priority of location here referred to is analogous to the advantage which a railroad company may acquire under the Railroad Right of Way Act of March 3, 1875, by locating and appropriating its right of way along a river bank or the shore of a bay, or through a pass in the mountains and leaving only less favorable locations for its possible future competitors in the same territory. If the Master shall be of opinion that the evidence with respect to plaintiff's advantage of position arising out of the priority of location of its gas distribution system is insufficient, plaintiff respectfully requests that the case be reopened to hear further testimony upon this point.

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VI.

Objections to the Master's Findings of Fact with Respect to the Value of Plaintiff's Used and Useful Gas Property in San Francisco Shown on Page 101 of said Draft Report.

Objection No. 13.—Plaintiff objects to the Master's finding of fact with respect to the total value of plaintiff's used and useful gas property in San Francisco and the findings with respect to the items designated as "structures" and "going value", set forth on page 101 of said draft report; and also objects to his failure to include in the total value of said property the reasonable value of its aforesaid patent right and franchise.

These objections are based upon the grounds hereinbefore stated.

VII.

Objection to the Master's Mixed Finding of Fact and Conclusion of Law with Respect to Compensation for Management.

Objection No. 14.—Plaintiff objects to the Master's mixed finding of fact and conclusion of law that plaintiff is not entitled to receive, in addition to the cost of operation and maintenance and a reasonable return upon the value of its property used and useful in supplying gas to its consumers in said City and County of San Francisco, a reasonable compensation for the service which it renders through the agency of its board of directors to its consumers by creating and maintaining an efficient organization of experienced men, by establishing a credit which enables it to obtain capital on favorable terms and by intelligently and efficiently directing and
 2061 supervising such organization and the general conduct of its business whereby the service rendered to consumers is improved and economies are effected which normally result in the gradual reduction of cost of service to its consumers.

The ground of objection No. 14 is that the finding and conclusion therein specified are not sustained by the evidence and proceed upon a clear misconception of the evidence bearing upon plaintiff's claim to compensation for management. The corporation consisting of its stockholders and board of directors continuously performs a service that is not compensated by salaries nor by a seven per cent return upon the value of its property.

VIII.

Objections to Findings of Fact with Respect to Annual Allowances to Reserves for Fire, Casualty, and Automobile Insurance.

Objection No. 15.—Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of ten thousand dollars (\$10,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of fire insurance.

Objection No. 16.—Plaintiff objects to the finding of fact shown on page 106 of said draft report that the sum of fifteen thousand dollars (\$15,000.00) is a reasonable and sufficient annual allowance to plaintiff for each of the three years from July 1, 1913, to and including June 30, 1916, in lieu of the cost of insurance against liability for personal injuries resulting from casualties.

2062 Objection No. 17.—Plaintiff objects to the finding of fact that plaintiff is not entitled to any separate allowance in lieu of the cost of insuring its automobiles.

The grounds of Objections Nos. 15, 16 and 17 are that plaintiff, having elected to carry its own insurance risks, is justly entitled to be allowed by way of compensation for the risks carried by it the same

amounts as it would have been required to pay to insurance companies if it had procured from them insurance against the same risks, and that such amounts should be included in and be deemed to be a part of the reasonable cost to plaintiff of producing and distributing the gas which it supplies to the City and County of San Francisco and its inhabitants.

IX.

Objections to Findings of Fact with Respect to Plaintiff's Costs of Operation and Maintenance.

Objection No. 18.—Plaintiff objects to the general finding of fact that plaintiff's reasonable costs for operation, maintenance and taxes were the amounts specified at the foot of page 110 of said draft report and no more; and, in particular, objects to the following specific findings embodied in the said general finding and shown in the appendices referred to on pages 107 and 108 of said draft report, and printed in full on pages 139 to 144 of said draft report, viz:

(1) That there should be deducted from the expenses shown in plaintiff's Exhibit No. 108 the item of floating debt interest, to-wit, for the year 1913-14 the sum of \$20,663.48, for the year 1914-15 the sum of \$24,818.16 and for the year 1915-16, the sum of \$5,547.00; and

2063 (2) That there should be deducted, from the item of general and administrative expense shown in plaintiff's Exhibit No. 108, for the year 1913-14 the sum of \$41,037.76, for the year 1914-15 the sum of \$42,912.59, and for the year 1915-16 the sum of \$36,310.39.

The grounds of Objection No. 18 are as follows, viz:

(a) The finding that the item of floating debt interest ought to be deducted from plaintiff's actual expenses of operation and maintenance is not sustained by the evidence.

(b) The finding that the sums specified in Objection No. 18 should be deducted from the amount of general and administrative expense apportioned by plaintiff to its San Francisco gas department is not sustained by the evidence.

(c) The finding that the sums specified in Objection No. 18 should be deducted from the amount apportioned by plaintiff to its San Francisco gas department as its just proportion of plaintiff's entire general and administrative expense is based in large part upon the finding shown on page 110 of said draft report that plaintiff's total general and administrative expense should be apportioned between plaintiff's San Francisco gas department and its other departments on the basis of revenue and not on the basis of the number of consumers in each department. The basis here adopted by the Master is inequitable and in conflict with the rule declared by the Supreme Court of the United States in the Minnesota Rate Cases, 230

U. S. 352, 459-461. Moreover the reasonableness of the plaintiff's apportionment of its total general and administrative expense which is shown in detail in plaintiff's Exhibit No. 109 is supported by the testimony of Mr. John A. Britton contained on pages 846 et seq. of the transcript of testimony and particularly by his answer 2064 shown on page 850 to the question shown on page 847 of said transcript, and the testimony of Mr. James T. Ryan shown on pages 2470 et seq. of the transcript of testimony and particularly the testimony appearing on pages 2482 to 2484 of said transcript. Plaintiff's Exhibit No. 19 mentioned in Mr. Britton's testimony shows the same amount as said Exhibit No. 109. The testimony here referred to, which stands uncontradicted, is to the effect that the entire amount of general and administrative expense apportioned by plaintiff to its San Francisco Gas Department, as shown in said Exhibits Nos. 108 and 109, is substantially less than the amount of such expense which would necessarily and properly be incurred if the plaintiff's San Francisco gas properties were owned, maintained and operated and its San Francisco gas business conducted separately from plaintiff's other properties and business by an independent company as owner. For the purpose of showing the exact amounts of the Master's deductions from the amounts of general and administrative expense apportioned by plaintiff in its said Exhibits Nos. 108 and 109 to its San Francisco gas department, which are attributable exclusively to his adoption of the revenue basis for the apportionment made by him, and the amounts attributable to his deductions from the aggregate amount of plaintiff's general and administrative expense, I have caused to be prepared a table consisting of two pages which are hereunto annexed and marked Exhibit A page 1 and Exhibit A page 2. In this Exhibit A the amounts of plaintiff's general and administrative expense assigned to its electric, gas, railway, water and steam departments collectively for each of the three years from July 1, 1913, to June 30, 1916, are the amounts arrived at by the Master in Appendix III on pages 143-4 of said draft report by deducting, from plaintiff's general and administrative expense assigned 2065 to said departments in its said Exhibits Nos. 108 and 109, the total amount of the deductions made by the Master in Appendix II on pages 140-142 of said draft report, and the several items of plaintiff's general and administrative expense as corrected by the Master for each of said years are then apportioned on the consumer basis employed by plaintiff in its Exhibit No. 109. A comparison of said Exhibit A with plaintiff's Exhibits Nos. 108 and 109 and the aforesaid appendices Nos. II and III attached to said draft report shows that the result of making the deductions allowed by the Master in said Appendix II is to reduce the amount of general and administrative expense apportioned by plaintiff in its said Exhibit No. 109 to its San Francisco gas department from the sum of \$162,382.40 to the sum of \$152,163.33 for the year 1913-14, from the sum of \$177,436.60 to the sum of \$164,497.94 for the year 1914-15 and from the sum of \$157,384.19 to the sum of \$144,556.09 for the year 1915-16. Hence it appears that the reduction in

this item of general and administrative expense for plaintiff's San Francisco gas department resulting from the Master's elimination from plaintiff's total general administrative expense of the items specified in said Appendix II is the sum of \$10,219.07 for the year 1913-14, the sum of \$12,938.66 for the year 1914-15, and the sum of \$12,828.10 for the year 1915-16; and that the reduction in this item of general and administrative expense for plaintiff's San Francisco gas department resulting from the Master's adoption of the revenue basis of apportionment in lieu of the consumer basis is the sum of \$30,818.69 for the year 1913-14, the sum of \$29,973.93 for the year 1914-15, and the sum of \$23,482.29 for the year 1915-16.

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X.

Objection to Finding of Fact with Respect to Fair Rate of Return.

Objection No. 19.—Plaintiff objects to the finding of fact set forth on page 111 of said draft report that the "minimum fair rate of return that plaintiff was entitled to earn" upon the present value of its property used and useful in furnishing gas to the City and County of San Francisco and its inhabitants "was seven per cent a year."

The grounds of Objection No. 19 are that the finding therein specified is not sustained by the evidence; and that plaintiff has established by a fair preponderance of the evidence that the minimum fair rate of return which the plaintiff was justly entitled to earn upon the present value of its aforesaid property was eight per cent per year. The issue with respect to the fair rate of return, or, in other words, with respect to what constitutes just compensation for the use of plaintiff's said property is, as the Master says on page 118 of said draft report, "a question of fact to be determined by a finding upon the evidence."

XI.

Objection to Summaries and Conclusions Shown on Pages 129 and 130 of Said Draft Report.

Objection No. 20.—Plaintiff objects to the summaries and conclusions shown on pages 129 and 130 of said draft report to the extent that they embrace and involve the errors to which the foregoing objections Nos. 1 to 19 inclusive are directed upon the grounds hereinbefore set forth. With reference to the "Ordinance Revenue" shown on page 130, plaintiff directs the Master's attention to the fact that plaintiff in its Exhibit No. 108 concedes that additions to its gross revenue as brought forward from Exhibit No. 38 should be made as follows, viz:

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(1) For the year 1913-14 the sum of \$8,650.45 making the corrected gross revenue the sum of \$3,414,182.96;

(2) For the year 1914-15 the sum of \$6,151.53 making the corrected gross revenue the sum of \$3,641,213.06; and

(3) For the year 1915-16 the sum of \$16,881.18 making the corrected gross revenue the sum of \$3,801,565.03.

XII.

Objection to the Master's Conclusion of Law With Respect to the Materiality of Evidence Showing That the Cost (Exclusive of Any Return on Used and Useful Capital) of Serving Consumers Using More Than Two Hundred and Seventeen and Less Than Eleven Hundred and Forty-Seven Cubic Feet of Gas Per Month During the Period from July 1, 1913, to June 30, 1916, Inclusive, Exceeded the Amount Which Plaintiff, Under the Ordinances Whose Validity is Drawn in Question in the Above Entitled Suits, Was Permitted to Charge Such Consumers for the Gas Supplied to Them.

Objection No. 21.—Plaintiff objects to the Master's conclusion of law expressed on pages 130 to 134 of said draft report that the fact that the natural and necessary effect of the aforesaid ordinances, if enforced, was to compel plaintiff to furnish gas to a large number of consumers, to-wit, approximately twenty thousand, in each of the three years from July 1, 1913 to June 30, 1916, at less than actual cost exclusive of any return on capital, the loss thence arising exceeding \$22,000.00 per year, is immaterial in the determination of the issue as to the reasonableness of the rates prescribed by, and the constitutionality of, said ordinances.

The grounds of plaintiff's Objection No. 21 are as follows.

2068 (a) The plaintiff, by evidence substantially free from conflict, established the fact stated in said Objection No. 21. In support of this statement see supplement to closing argument of counsel for plaintiff, Table XIX, pages 972 to 979 of the transcript of the argument and the testimony upon which said Table is based. For the purpose of showing that the changes necessary to adapt said Table to the Master's findings of fact in said draft report with respect to the present value of plaintiff's used and useful property and costs of operation and maintenance will not very materially change the results, I have had page 1 of plaintiff's Exhibit No. 75 revised in conformity with the Master's said findings of fact. A copy of said page 1 of plaintiff's Exhibit No. 75 is hereunto annexed and marked "Exhibit B."

(b) The fact that the plaintiff voluntarily established rates, including a maximum open to the objection that it is less than compensatory, is no answer to plaintiff's claim in these suits that the maximum rate fixed by the aforesaid ordinances is confiscatory and unconstitutional. In support of this proposition I rely upon the following cases:

Lake Shore and Michigan S. Ry. Co. v. Smith, 173 U. S. 684, 697;

Louisville & N. R. R. v. Interstate Commerce Com., 195 Fed. 541, 558;

Western Ry. of Alabama v. R. R. Com. 197 Fed. 954, 972;

(c) The Master's said conclusion is contrary to the law as declared and applied in the following cases:

Northern Pac. Ry. Co. v. North Dakota, 236 U. S. 585;

Norfolk & W. Ry. Co. v. Conley, 236 U. S. 205;

Smyth v. Ames, 169 U. S. 466, 540-2;

Cotting v. Godard, 183 U. S. 79, 86-98.

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XIII.

Objections to the Master's Conclusions With Respect to the Effect of Plaintiff's Evidence Concerning Book Costs and Purchase Cost of Plaintiff's Gas Properties.

Objection No. 22.—Plaintiff objects to the Master's conclusions shown on pages 134 to 137 of said draft report with respect to the effect of the evidence showing the book costs and the purchase cost of its aforesaid gas properties, including going value and franchise.

The grounds of plaintiff's Objection No. 22 are as follows:

(a) The Master's discussion of the subject of book costs and purchase cost evidences a misconception of the purpose and effect of the evidence adduced by plaintiff concerning those subjects. This evidence was not introduced for the purpose of establishing any other or different value of its lands and structural properties than that which was shown by the inventories and appraisements previously introduced in evidence. The object of the plaintiff in introducing testimony showing the book costs of said property was simply to establish a basis for apportioning the cost to plaintiff of the so-called intangibles, to-wit, going concern and franchises, which were included in the gas properties in San Francisco purchased by plaintiff from San Francisco Gas and Electric Company and Metropolitan Gas Corporation. The object of the plaintiff in introducing evidence showing the purchase cost to it of the gas properties acquired from the San Francisco Gas and Electric Company and Metropolitan Gas Corporation was to afford a basis for making a reliable estimate of the value of plaintiff's going concern and franchise. The combined effect of the testimony adduced by plaintiff with respect to

2070 book costs and purchase cost was to corroborate and substantiate the estimates made by witnesses who, by a different method, testified to their opinions concerning the value of plaintiff's going concern and franchise or privilege of using the public streets as a right of way for its gas mains and distribution system.

(b) Plaintiff's evidence with respect to book costs and purchase cost is cogent evidence compelling the conclusion that the element of going concern appertaining to plaintiff's said gas property and established business possesses a value of at least three million dollars and shows that the reason given by Judge Rudkin in the Spring Valley Water Company's case for reducing the Master's evidence of

going concern value of that company does not exist in the cases now before the Court.

(c) The opinion expressed by the Supreme Court of the United States in *Lincoln Gas and Electric Light Company v. Lincoln*, 250 U. S. 256, 267, appears to be the reverse of the opinion expressed by Judge Rudkin with respect to the facts relied upon by him in modifying the Master's finding in the *Spring Valley Water Company's* case with respect to going concern value. The pertinent part of said opinion is contained in the following quotation: (page 267)

"Again, we question the propriety of the master's treatment of 'going value,' which he seems to have estimated at less than otherwise he would have placed it upon the theory that the company's business had been developed, at the expense of the public, in the expenditure of past earnings exceeding a fair return upon the capital invested, and this without any finding, or any clear evidence to which our attention has been called, that past earnings were excessive."

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XIV.

Objections to the Master's General Conclusions Shown on Page 138
of Said Draft Report.

Objection No. 23.—Plaintiff objects to the Master's conclusion that the ordinances of the Board of Supervisors of the City and County of San Francisco fixing maximum rates for gas for the three years from July 1, 1913, to June 30, 1916, if they had been enforced, would have afforded plaintiff a fair return on the fair present value of plaintiff's property used and useful in supplying gas to said City and County of San Francisco and its inhabitants.

Objection No. 24.—Plaintiff objects to the Master's conclusion that the aforesaid ordinances provided a fair and just compensation for supplying gas to said City and County and its inhabitants and were valid under the Constitution of the United States.

Objection No. 25.—Plaintiff objects to the Master's conclusion that the defendant in said suits should have decrees in its favor dismissing the bills of complaint therein with costs to the defendant and proper provisions for return by plaintiff to the consumers of charges over the rates fixed by said ordinances.

The grounds of Objections Nos. 23, 24, and 25 are as follows:

(a) Said conclusions are based upon and involve the errors to which the foregoing objections Nos. 1 to 22 inclusive are directed.

2072 (b) Said conclusions ignore and give no weight to the decrees of the above entitled court which were introduced in evidence and copied in plaintiff's Exhibits Nos. 64, 65 and 66.

(c) Said conclusions ignore and give no effect to the evidence introduced by the plaintiff showing the results of its business of supplying gas to said City and County of San Francisco and its inhabitants during the year beginning July 1, 1912, and ending June

30, 1913. Defendant's testimony shows that under the operation of the ordinance in effect during said year 1912-13, which prescribed the maximum rate of seventy-five (75) cents per thousand cubic feet, plaintiff's actual net profit for that year was barely sufficient to constitute a return of five and one-half ($5\frac{1}{2}$) per cent upon the fair present value of its used and useful property as found by the Master herein even if its reserve for fire insurance should be fixed at \$10,000.00, its reserve for casualty insurance at \$15,000.00 and its depreciation reserve at \$325,000.00. In support of this statement I refer to plaintiff's Exhibit No. 72, page 1, which shows the plaintiff's gross revenue and expenses of operation and maintenance during the year 1912-13.

(d) The conclusions to which exception is taken in plaintiff's objections Nos. 23, 24 and 25, if they should be adopted by the Court, would result in taking from the plaintiff and giving to its consumers the benefit of all of the economies and savings in the matter of administrative expense effected by the plaintiff through its operation of its San Francisco gas properties and business in connection with its other properties and business and also the benefit of the economies and savings effected by plaintiff by its acquisition and use of the patent rights hereinbefore mentioned.

Wherefore plaintiff respectfully prays that the Master's said draft report to be revised and corrected in such manner as to obviate the objections hereinbefore set forth.

WM. B. BOSLEY,
Attorney for Plaintiff.

It is hereby stipulated that such of the foregoing objections, if any, as shall be overruled by the Master shall stand and be deemed to be exceptions to the Master's final report when the same shall be filed in the above entitled District Court.

WM. B. BOSLEY,
Attorney for Plaintiff.
GEORGE LULL,
City Attorney;
GEORGE J. DAILEY,
Assistant City Attorney;
ROBERT M. SEARLS,
Special Counsel,
Attorneys for Defendant.

EXHIBIT A, PAGE 1.

Pacific Gas and Electric Company, San Francisco District, Gas Department.

Statement of General and Administrative Expenses on Consumer Basis.

Recapitulation of Direct Segregations to Departments:		Fiscal year 1913-1914.	Fiscal year 1914-1915.	Fiscal year. 1915-1916.
A. Electric, Gas, Railway, Water and Steam Departments.....		508,694.41	554,021.08	501,597.80
B. Electric Department		69,548.49	67,146.41	69,454.69
C. Electric and Gas Departments.....		11,157.54	12,730.24	14,935.22
D. Gas Department		40,713.03	14,634.56	13,559.80
E. Electric, Gas and Steam Departments.....		71.55		
Total General and Administrative Expenses.....		690,145.02	648,532.29	599,547.00
Gas Department Proportion of Above (Consumer Basis):				
A. Electric, Gas, Railway, Water and Steam Departments (eliminate Railway on Revenue Basis, balance on consumer basis).....		280,206.84	308,184.29	273,300.54
C. Electric and Gas Departments (consumer basis).....		6,748.97	7,469.98	8,530.47
D. Gas Department (direct segregation).....		10,713.03	14,634.56	13,559.80
E. Electric, Gas and Steam Departments (consumer basis).....		43.24		
Total Gas Department Prop'n of Gen. & Admin. Expenses (on basis of consumer)		306,772.08	320,288.83	295,390.90
Amount Gen. & Admin. Expenses per Gas Consumer.....		\$1.45298	\$1.47504	\$1.36894
Number Gas Consumers S. F. District, June 30th.....		104,725	111,521	110,861
S. F. Gas Department Prop'n of Gen. & Admin. Expenses on basis of consumers		\$52,163.33	164,497.94	144,556.00

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EXHIBIT A, PAGE 2.

Pacific Gas and Electric Company, Gas Department, Consumer Basis.

Statement of General and Administrative Expenses.

	Fiscal year 1913-1914.	Fiscal year 1914-1915.	Fiscal year 1915-1916.
Expenses applicable to Electric, Gas, Railway, Water and Steam Departments as amended by Master's Report page 143.....	508,604.41	554,021.08	501,597.80
Gross Revenue:			
Electric, Gas, Water and Steam Departments.....	15,836,415.95	17,189,377.76	18,270,603.23
Railway Department	577,161.25	498,495.22	397,700.67
Total Gross Revenue.....	16,413,577.20	17,687,872.98	18,668,303.90
Average General and Administrative Expense:			
(Expenses divided by Gross Revenue) .....	.0309923	.0313220	.0268689
Railway Department Proportion Revenue Basis.....	17,887.55	15,613.87	10,685.78
Electric, Gas, Water and Steam Departments Revenue Basis.....	490,806.86	538,407.21	490,912.02
Total Expenses as above.....	508,604.41	554,021.08	501,597.80
Consumers (June 30th):			
Electric, Gas, Water and Steam Departments.....	358,228	391,366	406,915
Gas Department	211,132	223,919	236,537
Ratio of Gas Department to total all departments.....	58.937%	57.240%	55.672%
Gas Department proportion expenses applicable to Electric, Gas, Water and Steam Departments on consumer basis.....	289,203.84	308,184.29	273,300.54

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EXHIBIT B.

Revision of Exhibit 75, Page 1.

Analysis of Costs for Year of July 1, 1914, to June 30, 1915, Inclusive.

	Master's report, page No.	Total.	Prorated to—			Per cent prorated to—		
			Street lighting.	Consumers.	Output.	St. ltg.	Cons.	Out- put.
Maintenance of Generating Capital.....	139	\$55,702.06	\$1,554.10	.....	\$54,148.56	2.79	.....	97.21
Maintenance of Transmission Capital.....	139	2,951.04	66.40	\$570.76	2,313.88	.....	.....	.....
Maintenance of Distribution Capital (Excl. Account 1905)	139	123,835.27	3,829.94	86,631.40	33,433.73	.....	.....	.....
Generating Expenses	139	1,063,823.00	29,680.03	.....	1,034,142.34	2.79	.....	97.21
Transmission Expenses	139	34,117.80	951.80	.....	33,166.00	2.79	.....	97.21
Distribution Expenses (Excl. Acct. 1907)....	139	522,902.00	105,023.95	316,293.12	101,614.99	.....	.....	.....
Total Maintenance & Operating Ex- penses (Excl. Accounts 1905 & 1907). ...		1,893,391.92	141,106.94	403,465.48	1,258,819.50	.....	.....	.....
Maint. of Distribution Capital—Acct. 1905....		12,234.78	.....	.....	.....	.....	.....	.....
Distribution Expense—Acct. 1907.....		28,576.36	.....	.....	.....	.....	.....	.....
Total Maintenance & Operating Ex- penses		1,844,203.06	.....	.....	.....	.....	.....	.....
Taxes		162,320.90	8,700.40	30,418.94	123,201.56	5.36	18.74	75.90
Floating Debt Interest.....		.....	.....	.....	.....	.....	.....	.....
Uncollectible Accounts		27,883.40	.....	7,101.90	20,781.50	.....	25.47	74.53
Administrative Expenses	139	134,524.01	.....	34,263.27	100,260.74	.....	25.47	74.53

2077 *Receipt of a copy of the within* Objections to Draft Report is hereby admitted this 24th day of January, 1920.

GEORGE LULL,
JOHN J. DAILEY,
ROBERT M. SEARIS,
Attorneys for Defendants.

Endorsed: Filed Mar. 2, 1920. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

2078 In the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

Defendants' Objections and Exceptions to Master's Report.

Now come the defendants above named and file the following objections to the Master's draft report in the above entitled proceedings, which by stipulation hereunto attached, are to stand as defendants' exceptions to the Master's final report when filed, to the extent that said objections are over-ruled by the Master.

I.

Defendants object and except to the failure of the Master in Chancery to exclude from the value of complainant's properties for the year 1915-1916, the sum of \$12,180.00, representing the value of the land owned by the plaintiff situated at Martin Station.

II.

Defendants object and except to the inclusion by the Master in his report (page 21) of the item of lampblack and briquettes, \$13,115.69, as being an improper inclusion in the valuation of complainant's gas properties for rate fixing purposes.

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III.

Defendants object and except to the inclusion by the Master of the item of Intermediate Overhead on Street Lamps, \$14,941.30 (page 22, Report), as being an improper item to include in the valuation of complainant's plant for rate fixing purposes.

IV.

Defendants object and except to the inclusion by the Master in his value for rate fixing purposes of the item, Commercial Arc Lamps, \$149,949.80 (page 23, Report), as being improperly included in the valuation of complainant's plant for rate fixing purposes.

V.

Defendants object and except to the inclusion by the Master (page 31, Report) of the sum of \$231,555.72 in the valuation of complainant's plant for rate fixing purposes, said item representing the sums paid to complainant in years preceding the years in litigation by its consumers for the installation of service connections. Said objection and exception is based upon the grounds that said item is an improper item to be included in the valuation of complainant's properties for rate fixing purposes.

VI.

Defendants object and except to the inclusion by the Master in his valuation of complainant's property for rate fixing purposes (page 95, Report) of the sum of \$1,500,000 representing, as he states, additional value of complainant's property viewed as a going concern. Said objection and exception is based on the grounds that the addition of said sum or any part thereof as a separate item to the valuation of complainant's lands, structures and working capital, as found by the Master, is an improper inclusion in the valuation of
2080 complainant's properties for rate fixing purposes, and that there is insufficient evidence in the case to justify the amount found for said item.

VII.

Defendants object and except to the inclusion by the Master (page 109, Report) of the proportion allotted to the San Francisco gas department of complainant's subscription to the Panama-Pacific International Exposition held in 1915, as an item of operating expenses, for the purpose of determining the constitutionality of the rates involved in the above entitled proceeding.

VIII.

Defendants object and except to the Master's finding (page 111, Report) that the minimum fair return that complainant was entitled to during the years in litigation was seven (7) per cent per year, or any percentage whatever in excess of six (6) per cent. Said objection and exception is based on the grounds that a six (6) per cent rate of return to the complainant would not be a confiscatory rate.

IX.

Defendants object and except to the failure of the Master to include in the conclusions to his report (page 138) a conclusion that the defendant City and County of San Francisco should be entitled to the payment, for its own use and benefit, of such damages as may have been incurred or suffered by defendants or either of them, by reason of the temporary restraining order and injunction issued in the above entitled proceedings by the District Court. Said objection and exception is based upon the provisions of the restraining order issued in each of the above entitled proceedings.

X.

Defendants object and except to the failure of the Master
2081 to include in the conclusions to his report (page 138 thereof) a specific recommendation that the plaintiff be compelled to return to its consumers all charges in excess of the ordinance rates collected between the first day of July 1913, and the 29th day of October, 1917, together with interest thereon at seven (7) per cent from the dates of such collections.

Respectfully submitted,

GEORGE LULL,
City Attorney;
JOHN J. DAILEY,
Assistant City Attorney;
ROBERT M. SEARLS,
Special Counsel,
Attorneys for Defendants.

2082 It is hereby Stipulated that the foregoing objections to the Master's draft report may, to the extent that they are overruled by the Master, stand as objections to the Master's report when filed in the District Court.

GEORGE LULL,
City Attorney;
JOHN J. DAILEY,
Assistant City Attorney;
ROBERT M. SEARLS,
Special Counsel,
Attorneys for Defendants.
WM. B. BOSLEY,
Attorney for Plaintiff.

Service by copy of within original is hereby admitted this 10th day of January 1920.

WM. B. BOSLEY,
Solicitor for Plaintiff.

(Stipulation that overruled Objections may stand as exceptions Filed Jan. 10, 1920. H. M. Wright, Master.)

Endorsed: Filed Mar. 2, 1920. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

2083 In the District Court of the United States for the Northern District of California, Southern Division.

Equity. Nos. 27, 97, and 190.

PACIFIC GAS AND ELECTRIC COMPANY, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO et al., Defendants.

Opinion.

W. B. Bosley, Attorney for the Plaintiff.

George Lull, Robert M. Searls and John J. Dailey, Attorneys for the Defendants.

RUDKIN, *District Judge:*

The plaintiff is a corporation engaged in the business of manufacturing and supplying gas to consumers in the City and County of San Francisco. Pursuant to the requirements of the State Constitution the Board of Supervisors of the City and County, in the month of June, 1913, adopted an ordinance fixing rates to be charged for gas furnished to consumers for lighting and heating purposes during the year commencing July 1, 1913, and ending June 30, 1914. The ordinance fixed a maximum rate of seventy five cents per thousand cubic feet of gas, but prescribed no minimum. Soon after the ordinance took effect, the Gas Company commenced a suit in this court to restrain the municipal authorities from enforcing the ordinance, on the ground that it violated the due process clause of the Fourteenth Amendment to the Constitution of the United States, which declares that no state shall deprive any person of life, liberty or property without due process of law, or deny to any

2084 person within its jurisdiction the equal protection of the laws. Similar ordinances were adopted in the two succeeding years, and their adoption was followed by similar suits. By consent of parties the three suits were consolidated for trial and referred to a Special Master to take testimony and report to the Court. The cases are now before the Court on exceptions to the Master's report. The exceptions were argued at length before me on the last day of May and the first day of June of last year, but months elapsed before the filing of briefs and final submission. Since then I have carefully examined the Master's report, the briefs submitted, the voluminous testimony offered at the trial, and the arguments of counsel, and am now prepared to announce my conclusions. But inasmuch as a

final decision has already been too long delayed I must content myself with a reference to, and brief discussion of, the more important questions presented by the exceptions.

Generally speaking, the properties of the plaintiff used and useful, and reasonably necessary to the manufacture and distribution of gas may be described as follows: Lands; manufacturing and distributing plants, consisting of structures, machinery, apparatus, equipment and appliances; working capital; patent rights; going concern or established value; and the franchise of using the public streets of the city as a right of way for laying, maintaining and operating gas mains and service pipes with the necessary connections for supplying the City and County of San Francisco and its inhabitants with gas. The Master found that the reasonable value of these properties and rights for the year 1913-1914, including working capital, was the sum of \$13,976,435; that the reasonable cost of operation was

\$2,031,926.11; that \$348,853 was a reasonable allowance for 2085 depreciation; \$10,000 as a reserve for fire insurance; \$15,000 for casualty insurance; and that \$978,350.45, or seven per cent, was a reasonable return on the capital invested, making a total of \$3,384,129.56. The total revenue at the ordinance rate was \$3,405,532.51, or \$21,402.95 in excess of the seven per cent return on the capital invested. A slightly increased value was found for 1914-1915 and 1915-1916, and the net return for these respective years at the ordinance rates was \$89,446.12 and \$171,464.48 in excess of the seven per cent return which the Master found to be the lowest rate or return that would not result in confiscation. The Master concluded, therefore, that the ordinance rates were not confiscatory, and recommended that the several bills be dismissed and that proper decrees be entered to carry out the previous orders of the Court. Many items go to make up the values thus returned, and the allowances for operating expenses and depreciation, and many of these items have been excepted to by the respective parties. But any attempt to review each separate exception would extend the opinion to an inordinate length and to little purpose, especially in view of the fact that the allowance or disallowance of many of the smaller items would have no effect upon the final result. For this reason I will confine myself to the more important items in controversy.

Paving Over Mains.—The plaintiff contends that a reproduction of the plant would necessitate the cutting and replacing of the pavement laid over the mains by the city, and the cost of this is estimated at approximately \$600,000. The Master disallowed the item, and this ruling is the basis of one of the exceptions. In answer to a similar claim in *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153, 171, the Court said:

2086 "As to the item of \$140,000, which, it is contended should be added to the valuation, because of the fact that the Master valued the property on the basis of the cost of reproduction new, less depreciation, and it would be necessary in such reproduction to take up and replace pavements on streets which were unpaved when the gas mains were laid, in order to replace the mains, we are

of opinion that the court below correctly disposed of this question. These pavements were already in place. It may be conceded that they would require removal at the time when it became necessary to reproduce the plant in this respect. The Master reached the conclusion that the life of the mains would not be enhanced by the necessity of removing the pavements, and that the Company had no right of property in the pavements thus dealt with, and that there was neither justice nor equity in requiring the people who had been at the expense of paving the streets to pay an additional sum for gas because the plant, when put in, would have to be at the expense of taking up and replacing the pavements in building the same. He held that such added value was wholly theoretical, when no benefit was derived therefrom. We find no error in this disposition of the question."

So here, I find neither justice nor equity in the present claim, and the same is accordingly disallowed.

Franchises.—The plaintiff further contends that there should be added to the value fixed by the Master the sum of \$1,476,000 for the franchise of using the public streets of the city as a right of way, for laying, maintaining and operating the gas mains and service pipes. This item is based on the cost of procuring a private right of way through the city for the like purposes, less the difference between the cost of constructing the system over such private right of way and the cost of constructing the same in the city streets. The item was disallowed by the Master and his ruling forms the basis of another exception to the report. That a franchise of this kind is property and has value for some purposes does not admit of question, but such value depends entirely upon circumstances. If, as in the case of *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, the Company has a practical monopoly, is not subject to public regulation, and is permitted to pay enormous dividends on the invested
2087 capital, the franchise or franchises are naturally and necessarily of very considerable value. But on the other hand, where the rates are subject to public regulation and only fair and reasonable rates are permissible, a different situation is presented, and whether in such case the franchise has value or not depends largely upon the views of the rate making body and the decisions of the courts. If the Court should here find that the franchise in question has a value of approximately \$1,500,000 as claimed, and that the plaintiff is entitled to a reasonable return on that value, the value of the franchise is thus fixed as firmly as the value of any of the tangible property of the Company. But why should the Court make such addition or allowance. Nothing was paid for the franchise in the first instance, it is not exclusive, has no peculiar value, and when the plaintiff is allowed a fair return on the full value of its tangible property, including going concern value, it has no just ground for complaint. Such, it seems to me, was the view of the Supreme Court in the *Willcox* case. There the value of the franchises had been fixed upon consolidation in 1884 under legislative authority. The court below found the value of the

franchises in 1884 as thus fixed, and further found that their value increased thereafter in the same ratio as the value of the other tangible property of the company. The Supreme Court approved the valuation as fixed in 1884 under legislative authority because that valuation had been fixed by authority of law; the agreement regarding it had always been recognized as valid, and the stock had been largely dealt in for more than twenty years past on the basis of the validity of the valuation of the stock issued by the company. But the Court refused to allow any increase in that valuation, concluding that branch of the case by saying:

2088 "What has been said herein regarding the value of the franchises in this case has been necessarily founded upon its own peculiar facts, and the decision thereon can form no precedent in regard to the valuation of franchises generally, where the facts are not similar to those in the case before us. We simply accept the sum named as the value under the circumstances stated." The inference from this language is that under normal conditions such as here presented no franchise value should be taken into consideration or allowed.

Going Concern Value.—In fixing the value of the property and plant, the Master added for this element the sum of \$1,500,000 to the value of the physical property. To this finding both parties have excepted. Little can be gained from a discussion of a subject so intangible and speculative as this. The question has been referred to or discussed by the courts in the following, among the many cases that might be cited:

National Water Works Co. v. Kansas City, 62 Fed. 853, 864.

Knoxville v. Water Co., 212 U. S. 1, 9.

Des Moines Gas Co. v. Des Moines, 199 Fed. 204; 238 U. S. 153, 162.

Denver v. Denver Union Water Co., 246 U. S. 178.

Lincoln Gas Co. v. Lincoln, 250 U. S. 256, 267.

Spring Valley Water Co. v. City and County of San Francisco, 252 Fed. 977.

In the Knoxville case the Court refused to approve or disapprove an allowance of approximately ten per cent of the value of the physical property. In the Des Moines case no separate allowance for going concern value was made, but both Courts concluded that the element was taken into consideration and sufficiently provided for in the general findings of the Master. In the Denver and Spring Valley Water Company cases the allowance was considerably less than here. In this case the Master added approximately twelve per cent to the value of the physical property to cover this element, and 2089 under the circumstances disclosed by the record I think the allowance thus made was fair and just, if not liberal. The exception on the part of the plaintiff is therefore overruled.

Patent Rights.—The plaintiff acquired from its chief engineer and his assistant the exclusive right to use certain patented

devices and processes in the City and County of San Francisco and other counties of northern California, by the use of which the cost of manufacturing gas was materially lessened, and it claims an allowance of \$4,000,000 because of these acquisitions. A disallowance of the claim is the subject of another exception. The gas consumers of San Francisco have no concern with the exclusive rights thus acquired, even in the City and County, much less in other counties of the state. They are only chargeable with the reasonable cost or value of the right to use the devices and processes in the manufacture of gas in the City and County of San Francisco. In the Spring Valley case, *supra*, the Water Company for many years pumped water for its system from the gravel underlying a considerable acreage of agricultural land. These pumping operations lowered the water table to such an extent that the Company was threatened with litigation, and to avoid injunction suits and actions at law for damages it purchased the lands outright, and the value of these lands was added to the value of its other property for the purpose of ascertaining the rating base by the Master. In discussing this question the Court said:

"However desirable the acquisition of these lands might have been from a business standpoint, the fact remains that they are not necessary to the maintenance of the system, and not used or useful in connection therewith. It seems to me that the correct basis would be to ascertain as nearly as possible the value of the right or interest in these lands which is actually used for public purposes and base the rate of return on that valuation."

2090 So here, the rate of return should be based on the reasonable cost or value of the rights acquired for the purpose of manufacturing gas in the City of San Francisco and not elsewhere. The record affords no basis for such a finding, and under these circumstances the claim as made was properly rejected.

Insurance.—In each of the years in controversy the Master allowed as a reserve for fire insurance \$10,000, and for casualty insurance \$15,000. The plaintiff claimed a much larger allowance, and to the refusal of the Master to make the same an exception has been taken. The claim of the plaintiff to the additional allowance is based on the cost of procuring or obtaining insurance from the standard companies. I see no basis for this claim. As stated by the Master, a little less than half of the premiums received by insurance companies in general go to pay the expense of obtaining insurance, and why should the plaintiff, who took out no insurance, be entitled to these profits. It is unquestionably entitled to set aside a reasonable reserve to cover losses of this kind, but the record fails to show that such a reserve was not allowed. The allowance of the Master greatly exceeded the average losses of the Company during the eight preceding years, and this is persuasive at least that the allowance as made was fair and reasonable to the plaintiff. The exception is overruled.

Compensation for Management.—The plaintiff claims a considerable allowance for efficient management of the affairs of the Com-

pany during each year. I assume the Company was managed through its officers and agents and that they have been paid just compensation for their services. If they have not, that fact affords no sufficient reason for making a donation to stockholders 2091 at this time. This, as well as other claims, were doubtless taken into consideration by the Master in fixing the rating base and a reasonable return on the invested capital.

Much has been said in the course of the argument and in the briefs concerning original cost, book value and reserves for depreciation resulting from different causes, but I will not attempt to review the testimony bearing upon these questions. Suffice it to say that the findings of the Master are amply supported by the testimony, and beyond this I am not required or permitted to go.

Another contention is that the ordinances compel the plaintiff to furnish gas to small consumers at less than cost, and that such a requirement is violative of its constitutional rights. This question has been fully answered by the Supreme Court. Thus, in the Willcox case the Court said:

"So long as the total is enough to furnish such return it is not important that with relation to small consumers the price is not enough."

In support of this ruling the Court cited: *Minneapolis etc. & Co. v. Minneapolis*, 186 U. S. 257, and *Atlantic Coast Line v. North Carolina Commission*, 206 U. S. 1. It is a noteworthy fact that when the plaintiff was left free to act it established a maximum rate of only eighty-five cents, or less than the actual cost to small consumers. It is urged that the plaintiff was at liberty to give its property away if it chose, but it is not an eleemosynary corporation and in fixing rates was no doubt prompted by business considerations and not by charity.

The concluding finding of the Master is that seven per cent is a reasonable return on the capital invested and that any less rate of return would be confiscatory. To this finding both parties have excepted. I can add but little to what was said upon this subject in the Spring Valley case, supra, nor do I feel called upon to 2092 modify my views or answer the criticisms of the Master. But a word on this subject may not be out of place. It is said in the report that when the Court conceded that seven per cent was a fair rate of return the case was ended, and that the Court was controlled too largely by precedent. In other words, his view is that when the Court found the value of the property and the fair rate of return, it thereby established a procrustean standard to which all else must yield. Applying that rule to these cases, had the returns fallen short each year by the sum of \$25,000 the ordinance for the first year would be void, and the remaining two ordinances valid, notwithstanding the fact that all three ordinances were enacted under identical circumstances and prescribed the same maximum rate. Such a conclusion is, to my mind, absurd and ridiculous. The reason for this is obvious. The subject matter with which the Board

of Supervisors had to deal was full of doubt and intricacy at best. The valuation of the property was a mere matter of approximation and the operating expenses and income were unknown. The last two elements might be made certain by future developments but the uncertainty as to value would still remain. The valuation of a plant of this kind is largely a matter of guess work. Unlike cotton, wheat, and other commodities that are bought and sold daily on the market and have an established value, gas plants are seldom sold, and if one should be sold the selling price offers a poor criterion by which to fix the value of another where the surrounding circumstances may be entirely different. Noted engineers will differ, and differ widely, as to the value of such plants. The difference between the engineers who come before this Court so highly commended by the Master and by counsel is measured by millions and not 2093 by thousands. No two courts and no two juries would reach the same conclusion upon the same testimony. A difference of ten per cent in the appraisalment or valuation would be accepted as a matter of course rather than as a matter of surprise. The courts have no monopoly on the privilege of appraising or guessing. They must accord the same rights and the same privileges to the Board of Supervisors and the mere fact that they may differ from the board in their conclusions does not necessarily establish the charge of confiscating private property or denying to the citizen the equal protection of the laws. In other words, the court must not only differ with the board, but it must differ so widely that it is able to say in the language of the Supreme Court:

"In a case like this we do not feel bound to re-examine and weigh all the evidence, although we have done so, or to proceed according to our independent opinion as to what were proper rates. *It is enough if we cannot say that it was impossible for a fair-minded board to come to the result which was reached.*" (Italics supplied.)

San Diego Land & Town Co. v. Jasper, 189 U. S. 439, 441.

Approved in Knoxville v. Water Co., 212 U. S. 1, 17.

Does, therefore, the mere finding of the Court establish the fact that no fair minded board in the exercise of an honest judgment could reach a different conclusion. To some it may, but speaking for myself alone, I can only say that I assume no such arrogance and make no such claim to superiority, omniscience or infallibility.

These views find ample support in the authorities. Thus, in Spring Valley Waterworks v. City and County of San Francisco, 124 Fed. 574, 598, Judge Morrow found from the weight of the expert evidence before him that six per cent per annum was the smallest income that could be considered reasonable on the investment under consideration, and that five per cent was the 2094 smallest income which the Court could, under all the circumstances of the inquiry, consider reasonable and just. This case was followed by Judge Gilbert in Contra Costa Water Co. v. City of Oakland, 165 Fed. 518, 532, and Spring Valley Water Co. v. City and County of San Francisco, Id. 657, 665, and by Judge

Farrington in *Spring Valley Waterworks v. City and County of San Francisco*, 192 Fed. 137, 192. In the *Knoxville* case the Supreme Court said:

"It cannot be doubted that in a clear case of confiscation it is the right and duty of the court to annul the law. Thus in *Reagan v. Farmers' Loan & Trust Company*, 154 U. S. 362, where the property was worth more than its capitalization, and upon the admitted facts the rates prescribed would not pay one-half the interest on the bonded debt; in *Covington etc. Turnpike Co. v. Sandford*, 164 U. S. 578, where the rates prescribed would not even pay operating expenses; in *Smyth v. Ames*, 169 U. S. 466, where the rates prescribed left substantially nothing over operating expenses and cost of service; and in *Ex parte Young*, supra, where, on the aspect of the case which was before the court, it was not disputed that the rates prescribed were in fact confiscatory, injunctions were severally sustained. But the case before us is not a case of this kind. Upon any aspect of the evidence the company is certain to obtain a substantial net revenue under the operation of the ordinance. The net income, in any event, would be substantially 6 per cent, or 4 per cent after an allowance of 2 per cent for depreciation. See *Stanislaus County v. San Joaquin Company*, 192 U. S. 201. We cannot know clearly that the revenue would not much exceed that return. We do not feel called upon to determine whether a demonstrated reduction of income to that point would or would not amount to confiscation."

In the *Des Moines* case, supra, the Court held that there was no error in refusing an injunction upon the conclusion reached that a return of six per cent per annum on the valuation would not be confiscatory in the face of the report of the Master that the company ought to earn eight per cent. In the *Willecox* case, and in the case of *Cedar Rapids Gas Co. v. Cedar Rapids*, 223 U. S. 655, a finding of six per cent was approved. In the *Denver* case the Court held that a return of 4.2812 per cent of the value of the plant was confiscatory, but found it unnecessary to determine whether a considerable sum claimed for water rights should be added to 2095 the value. Should the value of the water rights be included the return would be further reduced. So far as I am advised this is the highest rate of return that the Supreme Court has ever declared to be confiscatory. True, in the more recent case of *Lincoln Gas Co. v. Lincoln*, supra, the Court disapproved a finding that six per cent upon the invested capital could not be regarded as confiscatory in view of the undisputed evidence accepted by the Master that eight per cent was the lowest rate sought and generally obtained as a return upon capital invested in banking, merchandising, and other business in the vicinity, seven per cent being the legal rate of interest in Nebraska. The bill of complaint however in that case was dismissed, so that the question as to what constitutes a confiscatory rate was not determined by the Court. If it be claimed that the Court there held that any discrepancy between the finding of the Court and the established rate which is prejudicial to the

public utility is confiscatory, it will be difficult indeed to reconcile the decision with many prior decisions of the same court. Under such a view the courts will in effect review the decisions of rate making bodies, notwithstanding their repeated disclaimer of their right and authority so to do. Furthermore, if any such hard and fast rule is adopted, public service commissions cannot safely establish what they themselves deem fair and reasonable rates. They must in addition allow a considerable margin of safety to cover possible deficiencies in revenue, increases in operating expenses, and differences of opinion as to values. If they do not, the courts will be constantly appealed to and the benefits of regulation will be more than offset by the burdens of litigation. The very fact that in the years in question here the rate of return differed more than 2096 one per cent on the total value of the property under substantially identical conditions all but demonstrates the utter fallacy and futility of such a course. I have not overlooked the fact that in many, if not all, the foregoing cases the returns in controversy had not been tested by time so that the exact rate of return was ascertainable, and this fact was in a measure controlling, but for reasons already stated, this is not the only element of uncertainty with which courts and rate making bodies are confronted in this class of suits.

It may be true that the Court did not consider the customary rate of interest on local investments as absolutely controlling, for, as said in the opinion:

"But it is a matter of common knowledge that interest rates vary almost as much in the same locality at different times as they do in different localities at the same time, and in an enterprise of this magnitude the question of locality, while entitled to consideration, is not controlling."

In the Willcox case the court said:

"Such compensation must depend greatly upon circumstances and locality; among other things, the amount of risk in the business is a most important factor, as well as the locality where the business is conducted and the rate expected and usually realized there upon investments of a somewhat similar nature with regard to the risk attending them."

As there stated, the risk of the business is the most important factor. Capital has no home and always seeks employment where it can gain the best returns with the least risk. In Stanislaus County v. San Joaquin C. & I. Co., supra, the Court declared that a statute reducing the compensation for supplying water to six per cent upon the present value of the property used for the purpose was not unconstitutional and that there was nothing in the nature of confiscation about it. The Court made no reference to local conditions; its language was as broad as the domain over which its jurisdiction

extends; was an applicable to Maine as to California, and was
2097 evidently so intended. In the recent case of *Simpson v.*
United States, 252 U. S. 547, the Court said that it would
take judicial notice of the fact that four per cent was very generally
assumed to be the fair value or earning power of money safely in-
vested, and it is but a very short step to take judicial notice of the
earning power of money invested in a public utility of this magni-
tude when subject to public regulation. In many of the cases to
which I have referred, little or no reference was made to local
interest rates or to local conditions, and for these reasons I feel that
my conclusions were fully justified, on both principle and authority.

Without further comment, I will only add that in no aspect of the
record can the Court say that the plaintiff has been deprived of or
denied the full protection of the Constitution. The exceptions to the
report of the Master are therefore overruled, and a decree will be
entered in accordance therewith.

2098-2102

Supplemental Memorandum.

Counsel seem unable to agree upon the disposition to be made of
the exceptions reserved by the defendants, in view of the statement
in the opinion that the exceptions to the report are overruled. As
soon as the Court reached the conclusion that the exceptions on the
part of the plaintiff were not well taken it became unnecessary to
discuss or consider the exceptions reserved by the prevailing party,
and for that reason no reference to such exceptions was made unless
an exception to the same ruling was reserved by both parties. In
the latter event the Court considered the question from the stand-
point of the plaintiff only, and deemed it unnecessary to consider or
view the report in any other aspect.

As was originally intended, the exceptions on the part of the plain-
tiff are therefore overruled, the report of the Master is confirmed,
and the final decree will so declare.

Endorsed: Filed June 6, 1921. Walter B. Maling, Clerk.

2103 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation,
Defendant.

(Citation on Appeal.)

UNITED STATES OF AMERICA, ss:

The President of the United States to City and County of San Francisco, a municipal corporation in the State of California, defendant in the above entitled cause, Greeting:

You are hereby cited and admonished to be and appear in the Supreme Court of the United States in the City of Washington in the District of Columbia within sixty (60) days from the date of this citation pursuant to an order filed and entered in the Clerk's office of the above entitled court allowing an appeal from the final decree which was made by the above entitled court and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 1, in the above entitled cause, wherein Pacific Gas and Electric Company is plaintiff and appellant and you are defendants and appellees, then and there to show cause, if any there be, why said final decree rendered against said appellant should not be corrected and why justice should

2104 not be done to the parties in that behalf.

Witness the Honorable William C. Van Fleet, United States District Judge for the Northern District of California, this 13th day of September, A. D. 1921.

WM. C. VAN FLEET,
United States District Judge.

2105 Receipt of a copy of the within Citation, and of plaintiff's Petition for Appeal and Assignment of Errors filed in same suit, is hereby admitted this 13th day of September, 1921.

GEORGE LULL,
JOHN J. DAILEY,
ROBERT M. SEARLS,
Attorneys for Defendant.

[Endorsed:] In Equity. No. 27. District Court of the United States, Northern District of California, Second Division. Pacific Gas and Electric Company, a corporation, Plaintiff, vs. City and

County of San Francisco, a municipal corporation, Defendant. Citation on Appeal. Wm. B. Bosley, Attorney for Plaintiff, 445 Sutter Street, San Francisco, California. Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

2106 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,
vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and
JAMES ROLPH, JR., Mayor of said City and County, Defendants.

(Citation on Appeal.)

UNITED STATES OF AMERICA, ss:

The President of the United States to City and County of San Francisco, a municipal corporation in the State of California, and James Rolph, Jr., Mayor of said City and County, defendants in the above entitled cause, Greeting

You are hereby cited and admonished to be and appear in the Supreme Court of the United States in the City of Washington in the District of Columbia within sixty (60) days from the date of this citation pursuant to an order filed and entered in the Clerk's office of the above entitled court allowing an appeal from the final decree which was made by the above entitled court and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 4, in the above entitled cause, wherein Pacific Gas and Electric Company is plaintiff and appellant and you are defendants and appellees, then and there to show cause, if any there be, why said final decree

2107 rendered against said appellant should not be corrected and why justice should not be done to the parties in that behalf.

Witness the Honorable William C. Van Fleet, United States District Judge for the Northern District of California, this 13th day of September, A. D. 1921.

WM. C. VAN FLEET,
United States District Judge.

2108 Receipt of a copy of the within Citation, and of plaintiff's Petition for Appeal and Assignment of Errors filed in same suit, is hereby admitted this 13th day of September, 1921.

GEORGE LULL,
JOHN J. DAILEY,
ROBERT M. SEARLS,
Attorneys for Defendants.

[Endorsed:] In Equity. No. 97. District Court of the United States, Northern District of California, Second Division. Pacific Gas and Electric Company, a corporation, Plaintiff, vs. City and County of San Francisco, a municipal corporation et al. Defendants. Citation on Appeal. Wm. B. Bosley, Attorney for Plaintiff, 445 Sutter Street, San Francisco, California. Filed Sep. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

2109 In the Southern Division of the District Court of the United States in and for the Northern District of California, Second Division.

In Equity.

No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and JAMES ROLPH, JR., Mayor of said City and County, Defendants.

(Citation on Appeal.)

UNITED STATES OF AMERICA, ss:

The President of the United States to City and County of San Francisco, a municipal corporation in the State of California, and James Rolph, Jr., Mayor of said City and County, defendants in the above entitled cause, greeting:

You are hereby cited and admonished to be and appear in the Supreme Court of the United States in the City of Washington in the District of Columbia within sixty (60) days from the date of this citation pursuant to an order filed and entered in the Clerk's office of the above entitled court allowing an appeal from the final decree which was made by the above entitled court and entered on the 6th day of July, 1921, in Equity Journal No. 5 at page 7, in the above entitled cause, wherein Pacific Gas and Electric Company is plaintiff and appellant and you are defendants and appellees, then and there to show cause, if any there be, why said final decree
2110 rendered against said appellant should not be corrected and why justice should not be done to the parties in that behalf.

Witness the Honorable William C. Van Fleet, United States District Judge for the Northern District of California, this 13th day of September, A. D. 1921.

WM. C. VAN FLEET,
United States District Judge.

[Endorsed:] In Equity. No. 190. District Court of the United States, Northern District of California, Second Division. Pacific Gas and Electric Company, a corporation, Plaintiff, vs. City and

County of San Francisco, a municipal corporation, et al., Defendants. Citation on Appeal. Wm. B. Bosley, Attorney for Plaintiff, 445 Sutter Street, San Francisco, California. Filed Sept. 13, 1921. W. B. Maling, Clerk, by J. A. Schaertzer, Deputy Clerk.

2111-2189 Receipt of a copy of the within Citation, and of plaintiff's Petition for Appeal and Assignment of Errors filed in same suit, is hereby admitted this 13th day of September, 1921.

GEORGE LULL,
J. J. DAILEY,
ROBERT M. SEARLS,
Attorneys for Defendants.

2190 In the Supreme Court of the United States of America.

Designated in United States District Court Equity Case No. 27.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, Defendant and Respondent.

Designated in United States District Court Equity Case No. 97.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and James Rolph, Jr., Mayor of said City and County, Defendants and Respondents.

Designated in United States District Court Equity Case No. 190.

PACIFIC GAS AND ELECTRIC COMPANY, a Corporation, Plaintiff and Appellant,

vs.

CITY AND COUNTY OF SAN FRANCISCO, a Municipal Corporation, and James Rolph, Jr., Mayor of said City and County, Defendants and Respondents.

Stipulation Consenting to Consolidation of Suits on Appeal and Specifying Portions of the Record to be Included in the Transcript.

Whereas the issues of fact and the questions of law involved in the three suits entitled as above are substantially the same; the first suit designated as equity case No. 27 in the District Court of the United

States in and for the Northern District of California, Second Division, having been brought in July, 1913, for the purpose of en-
2191 joining the enforcement of an ordinance of the City and County of San Francisco fixing seventy-five cents per thousand cubic feet as the maximum rate for gas for the fiscal year commencing July 1, 1913, on the ground that said ordinance was repugnant to the Fourteenth Amendment to the Constitution of the United States of America; the second of said suits designated as equity case No. 97 in said District Court having been brought in July, 1914, for the purpose of enjoining the enforcement of a similar ordinance fixing the same rate for gas for the fiscal year commencing July 1, 1914, upon the same ground; and the third of said suits designated as equity case No. 190 in said District Court having been brought in July, 1915, for the purpose of enjoining the enforcement of a similar ordinance fixing the same rate for gas for the fiscal year commencing July 1, 1915, upon the same ground; and

Whereas the three suits entitled as above were, by an order of said District Court, made pursuant to a stipulation of the parties, consolidated for trial and referred for hearing to Honorable H. M. Wright, Standing Master in Chancery; and

Whereas all three of said suits were tried pursuant to said order and submitted and decided upon the same evidence; and

Whereas the Master submitted one report applicable to all three cases, and the parties to said cases presented their objections and exceptions to said report; and

Whereas the exceptions to the Master's report were heard by Honorable Frank H. Rudkin, United States District Judge, upon the same record and the same briefs and oral arguments; and

2192 Whereas said judge decided all three cases in a single opinion; and

Whereas, pursuant to the opinion and decision of said Honorable Frank H. Rudkin, a separate decree was entered in each of said suits against the plaintiff and in favor of the defendants, the three decrees being substantially similar in form and substance; and

Whereas the plaintiff in each of said suits has perfected a separate appeal from the final decree in each of said suits; and

Whereas it is believed by the parties to said suits that their consolidation on appeal in the Supreme Court of the United States will diminish the labor of the last mentioned court, diminish the costs and expenses of appeal, and be in furtherance of justice;

Now, therefore, it is mutually stipulated by and between the parties to the above entitled suits as follows:

1. That the three suits entitled as above may be consolidated for hearing on appeal;

2. That the record on appeal to the Supreme Court of the United States shall consist of the original citation in each of said suits and of a true copy duly certified by the clerk of said District Court of the portions of the record in said suits designated as follows:

A. Portions of the record in said equity case No. 27:

1. Bill of complaint,
2. Answer,
3. Order overruling exceptions to Master's report,
4. Decree,
5. Petition for appeal to the Supreme Court of the United States, and order allowing appeal and fixing amount of bond.
6. Assignment of errors and prayer for reversal, and
7. Bond on appeal for all damages and costs to operate as a supersedeas.

2193 B. Portions of the record in said equity case No. 97:

1. Bill of complaint,
2. Answer,
3. Order overruling exceptions to Master's report,
4. Decree,
5. Petition for appeal to the Supreme Court of the United States, and order allowing appeal and fixing amount of bond,
6. Assignment of errors and prayer for reversal, and
7. Bond on appeal for all damages and costs to operate as a supersedeas.

C. Portions of the record in said equity case No. 190:

1. Bill of complaint,
2. Stipulation dated August 31, 1916,
3. Answer,
4. Order overruling exceptions to Master's report,
5. Decree,
6. Petition for appeal to the Supreme Court of the United States, and order allowing appeal and fixing amount of bond,
7. Assignment of errors and prayer for reversal, and
8. Bond on appeal for all damages and costs to operate as a supersedeas.

D. Portions of the record applicable alike to equity cases Nos. 27, 97 and 190:

1. Stipulation and order for consolidating cases,
2. Condensed statement of the evidence as required by equity rule No. 75,

3. Printed report and supplemental report of H. M. Wright, Standing Master in Chancery,

4. Plaintiff's objections to draft report of Standing Master in Chancery on final hearing,

5. Defendants' objections and exceptions to Master's report, and

6. Opinion of the court, Honorable Frank H. Rudkin, District Judge, presiding.

3. That the clerk of said Supreme Court may print the portions of the record specified above as one transcript, and, in printing the same, may omit: (a) the title of the suits in all papers except the bills of complaint; and (b) the verifications of the bills of complaint and answers; and, further, that the clerk need not print the orders of the judge of said District Court enlarging appellant's time 2194 for docketing said cases and filing the record thereof; and

4. That the briefs to be filed and the oral arguments to be made on behalf of the parties to the above entitled suits shall apply alike to all of said suits.

The parties to the above entitled suits respectfully pray that an order be made consolidating said three suits for the purposes of appeal pursuant to this stipulation.

Dated: San Francisco, April 6, 1922.

WM. B. BOSLEY,

Solicitor and Counsel for Plaintiff and Appellant.

GEORGE LULL,

ROBERT M. SEARLS,

JOHN J. DAILEY,

Solicitors and Counsel for Defendants and Respondents.

2195 & 2196 [Endorsed:] 28830—875, 876, 877. In the Supreme Court of the United States of America. Pacific Gas and Electric Company, a corporation, Plaintiff and Appellant, vs. City and County of San Francisco, a municipal corporation, et al., Defendants and Respondents. Stipulation consenting to consolidation of suits on appeal and specifying portions of the record to be included in the transcript. Wm. B. Bosley, Atty. for Pltf. & Appellant, 908 Balfour Building, San Francisco, California.

2197 & 2198 [Endorsed:] File No. 28830. Supreme Court U. S., October Term, 1921. Term Nos. 875, 876 & 877. Pacific Gas & Electric Co., App't, vs. City and County of San Francisco. Stipulation to consolidate; and designating parts of record to be printed. Filed April 15, 1922.

Endorsed on cover: File Nos. 28,830, 28,831, 28,832. N. California D. C. U. S. Term No. 331. Pacific Gas & Electric Company, appellant, vs. City and County of San Francisco. Term No. 332. Pacific Gas & Electric Company, appellant, vs. City and County of San Francisco and James Rolph, Jr., Mayor of said city and county. Term No. 333. Pacific Gas & Electric Company, appellant, vs. City and County of San Francisco and James Rolph, Jr., Mayor of said city and county. Filed April 15th, 1922. File Nos. 28,830, 28,831, 28,832.

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In the Supreme Court

OF THE
United States

OCTOBER TERM, 1923

Office Supreme Court, U.

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WM. R. STANSBURY

CLERK

PACIFIC GAS & ELECTRIC COMPANY,

VS.

Appellant,

CITY AND COUNTY OF SAN FRANCISCO,

Appellee.

No. **34**

PACIFIC GAS & ELECTRIC COMPANY,

VS.

Appellant,

CITY AND COUNTY OF SAN FRANCISCO and
JAMES ROLPH, JR. (Mayor of said city and
county),

Appellees.

No. **35**

PACIFIC GAS & ELECTRIC COMPANY,

VS.

Appellant,

CITY AND COUNTY OF SAN FRANCISCO and
JAMES ROLPH, JR. (Mayor of said city and
county),

Appellees.

No. **36**

**APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE NORTHERN DISTRICT OF CALIFORNIA.**

ADDITIONAL REPLY BRIEF FOR APPELLEES.

GEORGE LULL,

City Attorney,

City and County of San Francisco,

JOHN J. DAILEY,

Assistant City Attorney,

City and County of San Francisco,

ROBERT M. SEARIS,

Special Counsel,

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In the Supreme Court

OF THE

United States

OCTOBER TERM, 1923

PACIFIC GAS & ELECTRIC COMPANY,

Appellant,

VS.

CITY AND COUNTY OF SAN FRANCISCO,

Appellee.

No. 331

PACIFIC GAS & ELECTRIC COMPANY,

Appellant,

VS.

CITY AND COUNTY OF SAN FRANCISCO and
JAMES ROLPH, JR. (Mayor of said city and
county),

Appellees.

No. 332

PACIFIC GAS & ELECTRIC COMPANY,

Appellant,

VS.

CITY AND COUNTY OF SAN FRANCISCO and
JAMES ROLPH, JR. (Mayor of said city and
county),

Appellees.

No. 333

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE NORTHERN DISTRICT OF CALIFORNIA.

ADDITIONAL REPLY BRIEF FOR APPELLEES.

The following brief is filed, with the court's permission, in reply to an additional brief served on counsel for appellees by Mr. Titus just prior to the reargument of the cases ordered by the court. Discussion is limited to points specially raised in this additional brief, and we respectfully request the court to consider in connection therewith the arguments presented in our opening brief filed in behalf of appellees.

**THE SO-CALLED PURCHASE OF JANUARY 6, 1906.
REASONS WHY IT SHOULD NOT BE GIVEN CONTROLLING
WEIGHT IN FIXING A RATING BASE IN 1914.**

Appellant claims that the Master in Chancery, in fixing the total values on the appellant's plant for the 3 fiscal years under consideration of \$13,976,000.00, \$13,985,000.00 and \$14,415,000.00 respectively, ignored the value of the plant based on what appellant terms the purchase cost of the same, which their counsel insists was \$19,601,000.00 as of the date of June 30, 1914. This figure of \$19,601,000.00 is attained by adding to the so-called purchase price of the stock of the San Francisco Gas & Electric Company, paid in 1906, and segregated on the basis of assumptions which I shall shortly discuss between gas and electric properties, the net sums paid for additions and betterments to these properties after deducting an estimate of value of properties abandoned, destroyed or not useful since the date of that purchase. The appellee's reply to the claim

that there was error on the Master's part in refusing to take this so-called purchase cost into consideration is twofold. First, as a matter of law, he was not required to consider it. The Master had before him an agreed reproduction value of the physical properties as of June 30, 1914. The quantities and unit cost of the appraisal had been agreed to by the engineering witnesses for both parties (R. pp. 1220, '76). After deducting his finding of accrued depreciation on these physical properties, he added to their total value his findings as to the allowance for working capital and going concern, and also additions and betterments for the years succeeding the date of the valuation, including the price paid for the Jones patents (R. pp. 1192, 1228). He thus did everything that he was required to do under the provisions of law laid down by this court relating to valuation, and the fact that the result thus obtained and adopted by him as a rate basis was less than the so-called purchase cost does not constitute error of which appellant may complain here.

This court, in the *Minnesota Rate* cases, 230 U. S. 354 (Supreme Court Rep. No. 15, page 546) said:

"The making of a just return for the use of the property involves the recognition of its fair value, if it be more than its cost. The property is held in private ownership, and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law."

The above language was cited with approval in the recent decision of the *Southwestern Bell Telephone Co. v. Public Service Commission of Missouri*, decided May 21, 1923, (43 Supreme Ct. Rep., pp. 544-6) where Justice McReynolds held:

"It is impossible to ascertain what will amount to a fair return upon properties devoted to public service, without giving consideration to the cost of labor, supplies, etc., *at the time the investigation is made*. An honest and intelligent forecast of probable future values, made upon a view of all the relevant circumstances, is essential. If the highly important element of present costs is wholly disregarded, such a forecast becomes impossible. Estimates for to-morrow cannot ignore prices of to-day" (*italics ours*).

Clearly, if the present value is to govern where prices are higher than cost, it must also govern where they are lower than cost. The ruling in the *Southwestern Bell Telephone* case was held by the court in *Georgia Ry. & Power Co. v. Railroad Commission of Georgia*, decided June 11, 1923, (43 Supreme Court Reporter, pp. 680-2) not to be at variance with the decision in the latter case, which held in effect that there need not be a "slavish adherence" to replacement cost less depreciation in determining a rate basis.

In the *Georgia* case there was an attempt on the part of the plaintiff to insist that the valuation must be based on prices of the moment, and the Supreme Court held that in a rate case this was not

true but did state that the reproduction cost must have consideration in fixing the value. The principle enunciated in the *Southwestern Bell Telephone* case was also described as "established", in the recent decision in *Brush Electric Company v. The City of Galveston*, decided June 4, 1923, 43 Supreme Court Reporter, pp. 606-7. Again, in the case of *Bluefield Water Works Improvement Company v. Public Service Commission of West Virginia*, decided on the same day as the *Georgia Railway and Power* case, 43 Supreme Court Reporter, 675, the court reversed the judgment of the Supreme Court of West Virginia primarily on the grounds that neither the West Virginia Commission nor the Supreme Court had given sufficient weight to the enhanced cost of construction in 1920 over those prevailing about 1915 and before the war, where it said (pp. 677-8):

"The record clearly shows that the commission, in arriving at its final figure, did not accord proper, if any weight to the greatly enhanced costs of construction in 1920 over those prevailing about 1915 and before the war, as established by uncontradicted evidence; and the company's detailed estimated cost of reproduction new, less depreciation, at 1920 prices, appears to have been wholly disregarded. This was erroneous. *Missouri ex rel. Southwestern Bell Telephone Co. v. Public Service Commission of Missouri*, decided May 21, 1923 * * *

"The question in the case is whether the rates prescribed in the commission's order are confiscatory and therefore beyond legislative power. Rates which are not sufficient to yield

a reasonable return on the *value of the property used at the time it is being used to render the service* are unjust, unreasonable and confiscatory, and their enforcement deprives the public utility company of its property in violation of the Fourteenth Amendment. This is so well settled by numerous decisions of this court that citation of the cases is scarcely necessary. * * *

"It is clear that the court also failed to give proper consideration to the higher cost of construction in 1920 over that in 1915 and before the war, and failed to give weight to cost of reproduction less depreciation on the basis of 1920 prices, or to the testimony of the company's valuation engineer, based on present and past costs of construction, that the property in his opinion, was worth \$900,000.00" (*italics ours*).

These four very recent decisions of the Supreme Court seem to effectively settle the proposition that the rate basis is to be determined principally upon reproduction cost less depreciation and that out-of-date purchase costs or appraisals based on out-of-date figures cannot control the valuation. This should be especially true when the reproduction are agreed figures, as they are in the case at bar.

In this interpretation of the court's decisions, we are confirmed by a recent District Court ruling, where application for an injunction was heard by three District Judges in bank, as required by law. In the *Monroe Gaslight & Fuel Company v. Michigan Public Utility Commission*, 292 Fed. 139-142, the District Court of Michigan, in interpreting the effect of the decision of this court in the *South-*

western Bell case and in the *Bluefield Water* case unanimously held as follows:

"Particularly when we read the dissenting opinion, we must construe the majority opinion as the minority of the court interpreted it, viz., as holding that where it stands not impeached or attacked otherwise than it was in that case, *the reproduction cost is the dominating element in the fixing of the rate base; and if a Commission, which leaves it substantially unimpeached, fails to give it that dominating effect, there is an error of law which the court must correct.* The opinion in the *Bluefield Water Case* tends to confirm this construction of the *Southwestern Bell Case*. The rate base made by the Commission was set aside because due regard had not been given to reproduction cost. The court did not undertake to say just what 'proper consideration' would be. It did not think that the circumstances called upon it to say, as it did in the *Southwestern Bell case*, what the minimum permissible valuation was. Possibly this was for the reason that the appeal was from the state court, and the state court had so obviously adopted the theory of historical costs that to correct that error in general terms was thought sufficient.

"Nor do we find anything inconsistent with this view in the opinion in the Georgia Power Case. It affirms only that the reproduction cost at the date of the inquiry is not necessarily controlling. The reproduction valuation was made at the end of 1921—about the peak of high costs. The company claimed this value to be \$9,500,000. The Commission cut off \$4,250,000. \$2,000,000, which the company included, was for items obviously improper. About \$500,000 was cut off from items, upon findings which the court approved. This left the company's valuation of physical property as \$7,000,000. It ap-

peared that at the time of the trial court hearing construction costs were reduced, and that the court below had allowed some increases in the value of the property and had given careful attention to the whole matter of reproduction value. The true amount of accrued depreciation, the amount of fall in costs before the hearing, and of the other respects in which the company's valuation was attacked, do not appear. Comparison of the majority and minority opinions makes it clear that the majority did not think it was departing from the principle of the Southwestern Bell decision, but rather was adhering thereto" (*italics ours*).

It is submitted that the Master in Chancery complied implicitly with the above-mentioned rulings of the Supreme Court in his decision in the case at bar. He considered the evidence as to the 1906 purchase presented by plaintiff, as required by the *Georgia Railway* case, but rejected it as being unsatisfactory evidence of value. This rejection, based upon his conclusions after listening to the evidence in the case, should, we submit, be considered final on appeal. In the concluding portion of his report (R. p. 1220) he uses the following language:

"If there were no doubt in the purchase cost figures, and there were thus shown a bald discrepancy of five or six million dollars between what plaintiff paid for its properties and the master's present appraisal, it would mean that either the master or the purchasers had made a mistake, and naturally, I would stand by the verity of my own considered judgment. But these assumed purchase cost figures, taken as a whole, may properly perform a useful office as a check on separate items or divisions of my ap-

praisal. Take first the appraisal of lands and of the structures as new. The figures I have adopted are here agreed, except for the unimportant difference in allowances for overhead. It is thus possible that if the purchasers had before them an appraisal differing from the Jones appraisal they paid too much; the mistake cannot be mine."

He then goes on to analyze the possible grounds for discrepancy between the purchase cost and the reproduction valuation, and shows conclusively that the evidence as to what items were included or excluded in the purchase cost was not in such shape as to enable him to give the total figure controlling weight. We may search the record in vain for any testimony from the men who had to do with the actual purchase of the properties in 1906 as to the real basis of the price paid. All that we find is a statement from the present auditor of the company that the appellant bought the stock of its predecessor, the San Francisco Gas & Electric Corporation, in 1906 for \$90 per share, of which \$25.00 was paid in cash and *\$65.00 in bonds of a new corporation. These bonds were not redeemed until some six years later, and there is no evidence as to their value at the date of the purchase.* There is no *satisfactory* evidence to show what part of the so-called purchase cost was applicable to the gas properties of the appellant corporation (which are the only properties under consideration here) as distinguished from its electric properties, the ownership of which was also vested in the San Francisco Gas & Electric

Corporation. The sole evidence for this segregation is a balance sheet of the San Francisco Gas & Electric Corporation, prepared at or about the date of the purchase (R. p. 1093, appellant's additional brief p. 3). There is no evidence as to how this balance sheet was made up, or on what basis the figures therein shown as to the amounts for which the gas and electric properties were carried on the books of the corporation, were determined. In the absence of such evidence, it is not unfair to assume that the balance sheet was made up by consolidating balance sheets of the various companies that preceded the San Francisco Gas & Electric Corporation in the gas and electric business in San Francisco; that over a long period of years, these figures were gradually accumulated; and that as one company was taken over by the other and eventually consolidated into the San Francisco Gas & Electric Company, the book value of its assets was taken up upon the books of the latter concern without proper deduction for depreciation losses, duplicated plants, etc. The large number of balance sheets of the old constituent companies included in the record (pages 1068-1093) lend color to this suggestion, even though it is not possible to definitely prove that such was the case. If our assumption should be correct, then clearly the balance sheet is worthless as a basis for making the segregation. It is altogether probable that the figures for the gas properties, which had been in existence much longer than the electric properties, assigned too high a percentage of the so-

called purchase cost to the gas structures, because the surplus of "book value" over "actual value" resulting from many consolidations of competing companies would have had a longer time in which to accumulate.

We have suggested in our opening brief that probably the primary consideration of the plaintiff was to find a market for the output of its new hydro-electric plants in the Sierra Nevada Mountains when it bought the stock of the San Francisco Gas & Electric Company (page 84, opening brief), and that such being the case, undoubtedly the worth of the electric properties was the principal consideration in the minds of the purchasers. This surmise is not unreasonable in view of the failure of the plaintiff to produce witnesses to explain the basis of this purchase cost upon which its counsel now places so much emphasis.

Furthermore, we ask the court to bear in mind that immediately following this purchase, there occurred in San Francisco the tremendous earthquake and fire of 1906, wiping out a large part of the gas plants which had been bought, and in deducting the loss for these properties which were destroyed, the appellant has relied, not upon the figures at which they were carried on the books of the San Francisco Gas & Electric Company, but upon an appraisal made by its general manager subsequent to that disaster. Clearly, if these properties were carried on the books on the basis of their original cost new,

the resultant figure, after deducting the general manager's appraisal of losses made after the disaster of 1906, and long after most of the properties had been installed, would leave a considerable proportion of the original cost of properties which no longer existed in the remaining total. This remaining total is carried forward in the appellant's attempt to show value based on purchase cost. This error may also be present in the deduction of the appraised value of lands not in use, although it is fair to state that the probabilities are not so strong, as the lands probably enhanced in value. As the Master points out in his report, there is no showing whatever as to what allowance was made in said purchase cost for intangible items (R. p. 1221). If, for instance, a large amount was paid for promotion, good will, obsolete patents, or other intangible items, which have nothing to do with the determination of a correct rating basis under the decisions of this court, they should be eliminated before the purchase cost can properly be compared with the reproduction cost as determined by the Master. There is no evidence whatever on this subject.

In the light of the above circumstances, we respectfully submit that these stock and bond figures as of 1906 have no ascertainable bearing on the rating basis of June 30, 1914, adopted by the Master as a criterion for determining the validity of rate ordinances prescribing rates for the period from July 1, 1913 to July 1, 1916, and that the Master

committed no error in refusing to give them controlling weight.

Patent Rights.

**FULL VALUE MEASURED BY THE PRICE ACTUALLY PAID
DURING THE LITIGATION PERIOD, ALLOWED BY THE
MASTER.**

One of the main contentions presented in the additional brief filed in behalf of the appellant is that the sum of \$46,000.00 allowed by the Master as the value of the Jones patents for gas manufacture was wholly inadequate—that the Master should have allowed a value of \$4,203,000.00 for these patents; or that in lieu thereof he should have permitted the appellant to amortize out of the alleged savings in the cost of manufacturing gas during the years in litigation the entire value of the plant which appellant claims was rendered no longer useful when the new machinery involving the use of the new patents was installed. The value of these plants which were alleged to have been rendered useless by the patents is stated by appellant's counsel (page 16 of his additional brief) to be \$844,355.00.

The Master's separate allowance of \$46,000.00 for the patents was based on the fact that that was the price actually paid to the inventor for them in 1915 after the last of the ordinances in question had been adopted (R. pp. 1181, 1228). This inventor was the chief gas engineer of the appellant company, a man of high education and intelligence, thoroughly fa-

miliar with the technique of the gas industry (R. p. 175), and what his improvements in the manufacturing process were accomplishing in the way of savings (R. pp. 430, 431). If, after three years of experimentation and during the period involved in these suits, he was willing to sell for \$46,000.00 why should the Master have allowed a higher figure as being the reproduction cost of these patent rights? There was included in the additions and betterments to appellant's capital (R. pp. 182, 1125) over and above the valuation made as of June 30, 1914, every dollar expended by the appellant in improving its plants so as to permit the experimentation of the Jones process, and there was included in its operating accounts every dollar of operating expenses incidental to such experimentation (R. pp. 578-581). If there were to be a strict segregation of the amounts included in the Master's appraisal which could properly be applied to the cost of acquisition of the Jones patents, therefore, it would obviously be a sum much in excess of \$46,000.00, because it would include the cost of the new plants, the changes in the old plants, and the operating expense necessary and incidental to enable these experiments to be conducted. It is simply that in preparing the inventory and appraisal, the capital charges incidental to these changes in plants were added to the physical appraisal and were not classified as a part of the cost of patent rights. Similarly, no segregation was made of operating costs which were paid in operating the plants during such experiments.

They were charged in with the ordinary cost of operating the appellant's plant and deducted from gross revenue. These facts show that if, as the appellant insists, the full reproduction cost of the patents is the thing to be considered, then we must take into account that there has been included in the Master's allowance of additions to capital for the years in litigation and in his allowance for the operating costs, full reproduction cost of these patent rights as actually incurred during the period in litigation.

THE FOUR MILLION DOLLAR VALUE OF PATENTS, WHICH COST FORTY-SIX THOUSAND DOLLARS WAS NEVER CLAIMED TO EXIST OUTSIDE OF THESE CASES.

It is all very well for the appellant to introduce during the trial of these cases, held a year after the expiration of the last of the ordinances, testimony that the use of these patents effected great savings in the amount of crude oil used in gas manufacture and that the capitalized present worth of these savings was \$4,203,000.00. This is not proof of the fact that the *value* of those patent rights was \$4,203,000.00 during the period in litigation, and it is the reproduction value during that period with which we are here concerned. Appellant's counsel have not suggested for one moment that they would have been willing to pay, during the years in litigation to the inventor of these patents, the sum of \$4,203,000.00 or any considerable fraction of that sum, or that they could have sold the patents to

anybody else for any considerable fraction of that sum. They even go so far as to admit that no claim whatever was made for a valuation of these patent rights before the tribunal that fixed these rates in dispute, or that even after the period in litigation they ever made such a claim before the California Railroad Commission, which succeeded the Board of Supervisors as the rate-fixing tribunal (R. p. 450,* appellant's opening brief, page 5). The only place this claim has ever been made has been in the Federal Court after the period in litigation was passed and for the sole and obvious purpose of building up a valuation on which the rates in question could be held confiscatory. The Master concluded (R. p. 1228):

"* * * but in view of the fact that the company and the patentees, dealing presumably at arm's length, have reached a figure of about \$46,000.00 as the value of exclusive rights throughout northern California, I am as much embarrassed as was plaintiff's counsel in concluding that in San Francisco alone the rights are to be valued for the purpose of return at \$4,000,000.00 or any substantial fraction of that sum."

Assuming that the valuation were correct on the basis of this subsequent study, if it were not known by anyone during the years in litigation that the patent rights were worth such a sum, can it be said that they then had that value? Millions of acres of land have been sold at one time or another for rela-

* The word "defendant" in line 13, page 450, is a misprint. The original transcript reads "plaintiff".

tively small prices, and have subsequently been found to be valuable for oil or mineral deposits, which immediately enhanced their value a thousand-fold. Can it be said that for that reason the lands had this greater value prior to the discovery of such minerals? If such lands had been owned by the plaintiff and valued at their fair market value during the years in litigation by the rate-fixing body in determining appellant's rates, could those rates be held invalid during those years in litigation by a discovery made subsequent thereto that such lands were of immensely greater value? Of course they could not and of course these patent rights should not be valued at the figure that has been subsequently claimed for them in this proceeding.

THERE WAS NO TRUST RELATIONSHIP BETWEEN BUYER AND SELLER OF THESE PATENT RIGHTS.

Mr. Titus suggested in his brief that the patentee and appellant did not deal at arm's length—apparently on the grounds that patentee was chief engineer of the appellant's gas plants and had been allowed to conduct experiments with those plants. There is not one scintilla of evidence, however, to show that there was any agreement or tacit understanding between the chief engineer and the company that the patent rights should be sold to them for one cent less than their full value, and of that value the chief engineer and inventor, if anyone, must have been fully cognizant. The contract of

sale of these rights to appellant (Exh. 61, page 434) does not set forth or even suggest any trust relationship. In form it is simply a purchase and sale agreement upon specified considerations, all of which, as pointed out, have been included in the rate base or in the operating expenses.

ALL OBSOLESCENCE WAS PROVIDED FOR.

The record and the Master's report disclose that on the trial below the plaintiff was apparently convinced of the weakness of its case in claiming such a valuation (R. p. 1181). It accordingly introduced an alternative claim of the right to amortize the cost of plants which it averred had been rendered obsolescent by reason of the new inventions, out of the so-called savings from these inventions before any of those savings could be credited as part of the gross income under the rates. The Master met this contention in two ways: First, in his actual depreciation allowance he included a sum estimated to be the proper charge for the depreciation of these particular plants during the years in question, whether such depreciation could be due to physical depreciation, to improvements in the art, necessitating abandonment, to inadequacy, or to supersession (Appellant's Opening Brief, page 176). He made no segregation, nor did any witness, between loss of value due to obsolescence and loss due to physical deterioration, although appellant's counsel

has assumed a segregation of his own on the page of his brief just referred to. Appellant's counsel complain that this allowance was based on the bare proportion of the actual life of these plants which expired during the years in litigation and did not take into account that the expiration of these lives was hastened by the inventions; that hence the allowance was too small.

We submit that this is not so. The probable lives of the plants on which deterioration was computed by the Master were agreed upon by the engineers for both sides (R. pp. 279, 280, 283), with the exception that certain adjustments were made by the Master to appellant's advantage (R. pp. 1173, 1174). The actual life of these portions of the plant was a matter of historical record. As the depreciation was figured by the Master on a sinking fund curve and not on a straight line, it gave due weight to the fact that the loss in value increased more rapidly as the age of the plant approached the end of its life curve, and hence gave weight to the very factors of which complaint is here made. But, say counsel for appellant, this method also assumes that adequate depreciation allowances have been carried in the past. That is perfectly true. It assumes this, and the record amply supports the assumption. This point will be discussed more fully in connection with the subject of depreciation. Assuming, however, that adequate allowance was carried in the past, then the Master's allowance, taken in connection therewith, was sufficient to enable the appellant

to charge off against its depreciation reserves every item of plant which was rendered useless by the Jones inventions.

**THE JONES PATENTS WERE NOT THE SOLE CAUSE OF
OBSOLESCENCE.**

I cannot agree with the contentions of Mr. Titus in his additional brief that the obsolescence of Martin Station, Potrero Station and Independent Station was caused entirely by the Jones inventions. These plants were not new plants. Martin Station, the record shows, was built by a former competing company for the purpose of operating gas engines, designed to generate electricity (R. p. 187). It was subsequently converted into a gas plant, but owing to its situation at some distance from the center of plaintiff's system, being in fact outside of the City and County of San Francisco, its usefulness as a gas generating station was always considerably below par. At the Independent Station the gas generating apparatus was not up to date at the time the Jones inventions were made, even measured by the standards then extant, consisting, as it did, of some old water gas sets (R. pp. 429, 450). It is clearly improper to charge the write-off in value of this plant entirely to the new inventions. Potrero Station was not a new station either, and the old oil sets there had been installed over six years at the date of valuation and were figured in computing the annual depreciation allowance to go out of use in 1920

(R. 285). In fixing the annual depreciation allowance for the new Jones generating sets using the newly patented process at the Potrero Station, the witness Ellis, whose computations the Master adopted without modification, for these items, assumed, with the agreement of Mr. Jones and his son, the inventors themselves, a probable life of fifteen years, with due consideration of the element of obsolescence (R. pp. 279, 285). If this agreed assumption of life be correct then on what possible theory can the appellant be allowed to write off as an obsolescence charge the reproduction value new of the old generating stations which were superseded, and which had been in use for from ten to sixteen years at the date of this litigation?

**CONSUMERS ARE ENTITLED TO HAVE ACTUAL REVENUE
EARNED TAKEN INTO CONSIDERATION IN DETERMINING
VALIDITY OF RATES.**

Finally, counsel complain that the consumers are enjoying all the benefits of the new methods and that the complainant has lost its suit only because of the savings to its net revenue effected by these patents. In view of the very speculative evidence as to the amount of these savings, the weight of this argument may be disputed. The Master complains (R. pp. 1181, 1228) that the evidence afforded him no satisfactory basis for making any deduction, even if one were proper. But assuming that the exact amount of the savings were known, is that a

reason for eliminating them from the net revenue of the complainant? We submit that it is not.

The validity or invalidity of the rates is not to be determined by hypothetical assumptions as to what the gross revenue would have been if some event had not taken place or what the operating expense should have been, but rather by what actually happened. The plaintiff's consumers had no part in determining the policy of buying this apparatus. Suppose that it had turned out to be a failure, clearly this would not have justified deducting the cost of installing it from the value of the properties during the years in litigation. If it were a success on the other hand, it is equally equitable that the returns should be credited with the revenue from its use. Counsel suggests that such a policy may well discourage companies from embarking on new experiments and ventures. Our reply is that if that were a fact, it is nevertheless a question of policy for a rate-fixing tribunal to concern itself with and not a question involving any element of confiscation which needs to be considered by this court. As a matter of fact, the returns which the Master found the rates in question yielded are sufficiently liberal to justify the appellant in continuing a policy of improvement and economy.

THE AMOUNT OF "SAVINGS" IS GROSSLY OVER-ESTIMATED.

In all these statements I have conceded for the purpose of argument only, the correctness of the

estimate of appellant's expert as to the capitalized value of the so-called savings. The Master finds, after a study of the evidence, that these savings were undoubtedly due in part to the economies incidental to larger production (R. p. 1180). In other words, the unit costs of fuel oil going into gas manufacture are affected by the quantity of gas produced, as well as the labor costs in reducing the oil to its constituent gaseous elements. As to the savings in labor costs upon which part of the \$4,000,000.00 estimate is based, it is, of course, apparent that the larger the production, the smaller is the unit labor cost, and that even had appellant continued with the old processes, it would have effected some saving in the labor cost by reason of the increasingly larger quantities of gas produced during each of the succeeding years in controversy. Just how much this would have been the record does not disclose, but it shows that the method of estimating the capitalized value of savings as a basis for valuing the patent rights is open to challenge. Furthermore, the estimates are based on an assumed price for crude oil. This price fluctuates with the oil market, and if this method of valuing patents were to be followed, the capitalized economies might very well vary from fifty to one hundred per cent in amount within a relatively short period of time with consequent detriment to any scheme of rate fixing. The Master says (R. p. 1228), "Briefly, the evidence was entirely too speculative."

MUCH OF THE "SAVINGS" ARE OFFSET BY CONCURRENT LOSS
OF REVENUE-PRODUCING GAS.

And finally, we must observe that the record does not bear out the conclusions drawn by appellant's counsel on page 17 of his additional brief as to the amount of savings of which the consumer gets the benefit in use of the Jones patents. The sum of \$494,000.00 is obtained by multiplying the saving in generating cost per thousand feet of gas *manufactured* by the total quantity of gas *manufactured* (see Mr. Bosley's brief, page 136). *But the consumer did not get all the gas manufactured.* Referring to plaintiff's Exhibit No. 62, opp. page 440 of the record, it will be seen that the percentage of gas lost through leakage and non-revenue producing uses *increased* from 9.98% in 1912, before Mr. Jones commenced his experiments, to 10.32% in 1913, 14.7% in 1914, 17% in 1915, and 10.80% in 1916. That is to say, the consumers were being charged for nearly twice as much gas that was never delivered to them in 1915 when the Jones process was in full swing as in 1912 under the old methods—for the cost of manufacturing the non-revenue producing gas goes into the operating expense upon which the rates are based just the same. To show the combined effect of the savings alleged to be due to the Jones process and the concomitant losses due to increased leakage, etc., we submit the following table based on plaintiff's Exhibit 62 (opp. page 440 of Record):

YEAR	Cu. FEET SOLD	GENERATING COSTS	COST PER M. SOLD	UNIT DIFFERENCE	LOSS	GAIN
1912	3,998,570	\$854,651	.214			
1913	4,447,150	995,807	.224	+.01	\$44,471	
1914	4,510,136	994,142	.220	+.006	27,060	
Jan.-Mar. 1915	1,359,135	279,726	.206	-.008		10,873
Apr.-Dec. 1915	3,757,080	776,784	.206	-.008		30,056
Jan.-June 1916	2,570,437	466,011	.182	-.032		82,000

 \$71,531

 \$122,920
 71,531

 Net Savings.....\$51,398

In other words, if, as counsel for appellant claim, the appellant saves \$494,000 due to the Jones process, the consumers only got the net benefit during the period in litigation of \$51,000 of that sum, because of the concurrent increase in leakage and non-revenue producing use of gas by appellant. We do not say, because we do not know from the record, whether or not this increased loss in gas was due to the Jones process, but we do insist that the appellant's own evidence shows that it was incident to the manufacture of gas during those years. If we are going to consider whether the *consumer* should be charged with the whole or part of the savings, we certainly ought to take the whole story into consideration. If we do this we shall find that the Master's showing of an annual allowance of \$93,700 over and above average replacement costs (R. p. 1176) is more than sufficient to cover all the *savings* the consumer enjoyed during the years in litigation due to the Jones patents, and is a substantial contribution to the amortization of obsolescence losses.

JUSTIFICATION OF MASTER'S TREATMENT OF OBSOLESCENCE.

We proceed to answer, in the order presented, appellant's criticisms of the Master's reasoning on the subject of obsolescence as set forth on pages 18 to 28 of Mr. Titus' additional brief.

First: Appellant should have foreseen the so-called obsolescence losses and provided for them in

advance. Counsel quotes at length the Master's very persuasive reasoning on this point, and says that the Master allowed less than \$50,000 per year for obsolescence of Martin Station which would have necessitated the commencement of provision for its amortization as early as 1908 or 4 years prior to the Jones experiments leading to an improvement in manufacturing processes. We are not advised as to the basis of counsel's statement that the Master allowed \$50,000 annually for *obsolescence* at Martin Station, inasmuch as the method of computing annual depreciation employed by the Master took into account without segregation physical deterioration, obsolescence and inadequacy (R. p. 1171), but assuming that counsel is correct, there is nothing unreasonable in assuming that appellant had foreseen or should have foreseen as early as 1908 that generator sets installed in 1905 would at some date in the future be rendered obsolete due to improvements in the art. This is generally true of all manufacturing apparatus and particularly of complicated machines for the distillation of crude oil. As the Master points out (R. p. 1169):

*** * * the city's counsel is fairly justified in his comment that the obsolescence which latterly has operated to displace water gas generators by oil gas generators, and the old oil gas process and machines by the improved Jones process and machines, has not been an overnight revolution, but rather an evolution evidenced by economic changes and technical experimentation and construction extending over a period of at least ten years between changes. Further-

more, since 1905 the plaintiff has had a monopoly of the gas business in San Francisco and therefore has not been forced by competition to change its methods of manufacture. My conclusion is that plaintiff had ample notice of replacements due to obsolescence, and that a reasonable business caution, especially since the announcement of the Knoxville decision, would have dictated the formation of a reserve in advance of abandonment through obsolescence. And though the improved Jones sets seem to the beholder the last word in gas generators, it seems to me a prudent owner would even now be forming a reserve for their replacement."

The Knoxville decision referred to by the Master was rendered in 1908 and was sufficient notice to all well-managed concerns to make provision for the amortization of depreciation of all kinds. Furthermore, as the Master points out, past history was a reliable guide even at that date and a prudent manager, without knowledge of the exact event which might cause abandonment, would have had at his command ample statistical data upon which to estimate the future within a reasonable degree of certainty. The Master's conclusion on this point was entirely reasonable and in accordance with the principles enunciated in the *Knoxville* case (212 U. S. 1, 14), as well as the past practices of the appellant and its immediate predecessor, the San Francisco Gas & Electric Company.

Second: Appellant did actually foresee that obsolescence losses would occur and provided reserves to cover them in advance. Counsel says that these

reserves were provided for losses due to depreciation and earthquake which had occurred prior to 1908. We submit that the record does not sustain this contention. The subject is discussed in our opening brief at page 36 et seq. We may supplement our argument there with a few undisputed figures from the record (p. 682). Prior to the purchase of the stock of the San Francisco Gas & Electric Corporation in 1905, a total of \$693,000 had been credited on the books of that company to depreciation to the gas department reserve and the balance in that account, after deducting all charges for abandonment, etc., on December 31, 1904, were \$667,873. This balance was transferred into the general surplus of the company at the time of the sale of its stock to the appellant, together with another balance of \$142,000 in the Fire and Casualty insurance account. The company, therefore, faced the great disaster of 1906 with reserves aggregating over \$800,000 in the gas department alone, which had just been transferred to general surplus.

After the disaster of 1906, nothing was done until 1908, when with an apparent prescience that a considerable portion of the gas plant was going to be due for replacement before long, the managers of the San Francisco Gas & Electric Corporation, which it will be remembered was entirely controlled by the appellant at that date, set up new reserves for depreciation. They were not set up as reserves for past fire and earthquake losses at all, but for *depreciation*. Charges were regularly

made against them for replacements and abandonments. By November, 1911, the unused balance in this reserve was \$2,116,000 for the gas department alone. Counsel for appellant says this was done at the expense of a fair return to its stockholders. In the first place, that fact cannot be determined here, because there is no evidence before the court on which a determination of what would have been a fair return to the stockholders in those years can be made. But, assume that due to the loss of business incidental to destruction of over half the city in the 1906 disaster, appellant's net earnings were inadequate for a few years. If, by its own voluntary act, reserves were set up out of earnings, and presumably allowed for by the rate-making tribunal in fixing rates, for the sole purpose of covering "depreciation", is not the same rate-making tribunal entitled to take that fact into account in future rate-making proceedings? If the amount of that reserve was more than sufficient to take care of ordinary replacements and accruing depreciation and obsolescence on all existing structures, can the appellant, by the "stroke of the pen" referred to by its counsel, wipe out the accumulated balance by transferring it to "general surplus" and declare future rates confiscatory if they do not permit a reaccumulation within three years of an adequate credit? Does the fact that, *just prior to and during the period in litigation*, appellant proceeded to write off against that surplus all of the ancient losses it could find resulting

from consolidations of competing companies with attendant losses due to duplicated plants, the 1906 disaster, (then six years past), rights, good will, and any other non-existent asset it could find (R. pp. 674, 675, 676) entitle it to have rates declared illegal and void if they do not allow for the replacement of reserve credits thus confiscated by the appellant? Can a public utility, by manipulation of its books during the period in litigation, affect the validity of the rates under attack? An affirmative answer to the last three questions is unthinkable, yet it must follow if counsel's contentions in his additional brief be accepted. It is true, we are dealing with the present, not the book value of appellant's assets, but if rates must yield revenue enough to amortize the loss in worth of structure due to depreciation and obsolescence, and those structures have existed for a period of years in the past, justice can be done to neither utility nor consumer unless we know what provision has been made in the past for that amortization. We have found here that ample provision was made, by the voluntary act of appellant, to amortize all that portion of the losses accruing at Martin, Independent and Potrero Stations, which the Master, on the evidence presented, found to be properly chargeable to the past. We submit that the court should not sanction this latter day attempt of the appellant to destroy that wisely provided reserve by charging against it losses with which we are in no way concerned in this case, and that the Master's

very persuasive reasoning on this point should be approved (R. pp. 1168-1171).

Third: Counsel for appellant next refers to the Master's ruling that evidence as to these past fire and earthquake losses was inadmissible to reduce present reserve balances, and draws the erroneous conclusion that no provision was made for Martin Station. We have already pointed out that gas plants commence to depreciate from the day they are installed, even though they may for years be in perfectly serviceable condition; that prudent owners do not wait for the time when approaching obsolescence becomes apparent to every one before commencing to provide for the same; that as early as 1908 the owners of Martin Station could have been and undoubtedly were aware that constant improvement in gas manufacturing methods had been and in all probability would be made; and that ordinary business prudence would dictate the creation of reasonable reserves to provide for this contingency when it should occur. The evidence and the Master's findings show, as pointed out, that adequate provision was in fact made. Counsel's argument that it could not have been made because the exact date when some inventor would make the next process improvement was not then known, would apply with equal force to fire insurance and other provisions for contingencies even less certain to occur than obsolescence of a gas generator.

Fourth: Earthquake losses cannot be reimbursed out of present rates. Appellant's counsel admits this but says he is not taking them into account. If he writes them off against depreciation reserve credit balances and then claims the rates are confiscatory because they do not yield enough revenue to take the place of balances thus destroyed, we are unable to follow him in his conclusion. He has accomplished by indirection the very thing he admits should not be done.

Fifth: Appellant's counsel harks back to the old argument made at the trial that obsolescence of the generator plants must be amortized out of savings due to the new processes which it was claimed caused the obsolescence. Appellees have never disputed the equity of this principle when applied to a plant for the amortization of which no other provision has been made, provided a reasonable period for amortization is allowed. If, as was pointed out during the first argument of this case in the Supreme Court, the Master's allowance were continued in effect for a sufficient number of years, it would permit of the amortization of the Martin, Independent and old Potrero generator sets. But that would not suit the appellant. It selects a period short enough to require a very large allowance during the years in litigation, and contends that confiscation has taken place if its contentions are not adopted. In the state of the evidence we fail to see how this court can do otherwise than

approve the allowance made by the Master, especially in view of the past reserves carried by the appellant.

PAVING OVER MAINS.

In the additional brief filed in behalf of appellant, the old argument is raised that there must be included in reproduction cost of appellant's plant the cost of cutting pavement over gas mains which was not installed when the mains were laid. An attempt is made to distinguish the facts in this case from those in the *Des Moines Gas* case, 238 U. S. 171, on the grounds that the appellant must have paid for some of this pavement cutting in 1906, and a statement made by the Master is quoted to the effect that paving over mains was "undoubtedly represented in the purchase cost." There is not a scintilla of evidence in the record as to whether or not the item was in fact included in the 1906 price. The Master was tentatively comparing his total cost when he made the above statement and was reflecting upon the probable grounds for the discrepancy. His assumption that paving over mains was one of the items making up the difference should not be taken as a finding that such was the case in fact, nor does he even suggest that the sum of \$612,931 was the amount included for this item in the "purchase cost." For instance, pavement has been laid since 1906 over many previously installed mains and the cost of cutting this pave-

ment recently installed amounts to \$269,000 (Items 8 and 9, Record page 184 and accompanying testimony on page 189). If the figure was included in the "purchase cost" at all, it could not have exceeded \$325,000 (R. p. 189). For aught that appears in this record, that 1905 purchase may have been based primarily on a capitalization of earnings, without any reference to the cost of pavement cutting.

In short, no new reason appears in the case at bar for reversing the ruling in the *Des Moines* case. The Master found that pavement over mains was a benefit to the pipes in protecting them from injury and lengthening their useful lives and a detriment to them in increasing the maintenance costs (R. p. 1134), but is unable to state, on the basis of any evidence before him, the relative amounts of benefit and detriment in money.

We submit that it is no more equitable to appellant's ratepayers to charge them with a return on this hypothetical cost which does not represent fair value, than it would be to appellant to value its plant on the basis of the cost of reproducing an equivalent substitute plant which would render the same service, instead of taking the plant actually in use. No harm is done to appellant. It does not own the pavement. It never incurred the expense of cutting it. There is no showing as to the amount, if any, that it has added to the value of its plant. We submit that appellant's objection is not well taken.

GOING CONCERN VALUE.

The burden of the complaint expressed in its additional brief on the subject of going concern value is that the Master did not take the opinion testimony of appellant's witnesses at full face value in estimating the amount of his allowance for going value. We know of no rule of law which requires a court to accept without reduction a witness's opinion as to value, even if not contradicted by opposing testimony. It may be that the examination or cross-examination of an expert will develop flaws in his assumptions or reasoning or evidence of relationship to the party calling him which indicates bias. All these elements affect the weight of his conclusions, and unless the record discloses testimony and reasoning so unassailable or attitude of impartiality so beyond criticism, that no fair minded judge could do otherwise than to give full credit to the expert's conclusions, we fail to see any justification for changing the court's finding on appeal.

As pointed out in the recent decision in the *Georgia Railway and Power* case (43 Sup. Ct. Rep. 680, 682), a finding of going concern value is a finding of fact. It is entitled to all the weight of other findings on the evidence.

In pages 58 to 64 of our opening brief, we pointed out fully what appeared to be fatal weaknesses in the qualifications of the appellant's principal witness, and serious errors in his assumptions and reasoning, as well as the perfunctory character of the

so-called corroboration evidence. It is unnecessary to repeat the argument here, except to point out that there may be found in the record many reasons to justify the Master in cutting down the three million dollar figure suggested by appellant's witness besides the views of the District Judge in the *Spring Valley Water* cases. The Master himself says at page 1187:

"After *due consideration of all the evidence and with a desire to reach a fair but conservative estimate*, I allow \$1,500,000 in each of the years under examination to cover the additional value of the property appraised, viewed as a going concern" (italics ours).

and again at page 1221:

"In finding the amount to be added for going value there is inherent the difficulty that it is not capable of convincing mathematical demonstration, but *must depend largely upon sound judgment upon the evidence, necessarily very conservatively exercised*; and in such judgments the chance of error is necessarily great" (italics ours).

Admitting that he was also influenced by the criticism he had received from the District Judge in a previous case for accepting one of these fanciful going concern value estimates at its full face amount, it by no means justifies the conclusion that in these cases at bar he would have repeated such a finding were it not for the prior decision. As pointed out in our opening brief, the percentage of the total rate base allocated to going concern value in these cases

is actually in excess of the percentage which obtained in the *Spring Valley* cases, and is in line with percentages in many cases where the finding has been approved by the Supreme Court (Appellee's Opening Brief, page 50). We again dispute counsel's assertion on page 34 that there is any competent evidence showing that the gas plant under consideration cost appellant \$19,000,000 or that if it did, the excess over the Master's figure was due to going concern value. There is just as much evidence to justify our surmise that the real reason for the big stock and bond price in 1906 was to obtain a much-needed market for appellant's hydro-electric energy. Our conclusion is that the Master's allowance was ample under all the circumstances.

FRANCHISE VALUE.

No new argument is made in the additional brief on this topic, but as a final answer to the long argument in the opening brief, filed by Mr. Bosley, we wish to refer to the language in the *Georgia Railway and Power* case (43 Sup. Ct. Rep. 680, 682), decided since the last hearing of the case at bar, which we submit applies with equal force to the appellant's contention. It was there said,

"The franchise in question is not a monopoly. It is merely a perpetual permit, granted by the Legislature in 1856, to maintain gas mains in the streets, alleys and public places of Atlanta without the necessity of securing the consent of

the municipality. That such franchises are to be excluded in fixing the rate base was settled by *Cedar Rapids Gas Co. v. Cedar Rapids*, 223 U. S. 655, 669, 32 Sup. Ct. 389, 56 L. E. 594; *Des Moines Gas Co. v. Des Moines*, 238 U. S. 153, 169, 35 Sup. Ct. 811, 59 L. Ed. 1244, and *Galveston Electric Co. v. Galveston*, 258, U. S. 388, 42 Sup. Ct. 351, 66 L. Ed. 678. The allowance for the franchise made in *Willcox v. Consolidated Gas Co.*, 212 U. S. 19, 43, 44, 48, 29 Sup. Ct. 192, 53 L. E. 382, 15 Ann. Cas. 1034, 48 L. R. A. (N. S.) 1134, was rested on special grounds which do not exist in this case."

In conclusion, we submit that the more elaborate argument presented in Mr. Titus' additional brief has not demonstrated any error in the Master's reasoning; that measured by every test the rate ordinances in question stand the test of constitutionality; that the judgments and decrees entered below should be affirmed.

Dated, San Francisco,
February 9, 1924.

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City and County of San Francisco,

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Solicitors for Appellees.



IN THE

Supreme Court of the United States

October Term, 1903

No. 34

**Pacific Gas and Heating Company, Appellant,
vs.
City and County of San Francisco, Respondent.**

No. 35

**Pacific Gas and Heating Company, Appellant,
vs.
City and County of San Francisco, Respondent.**

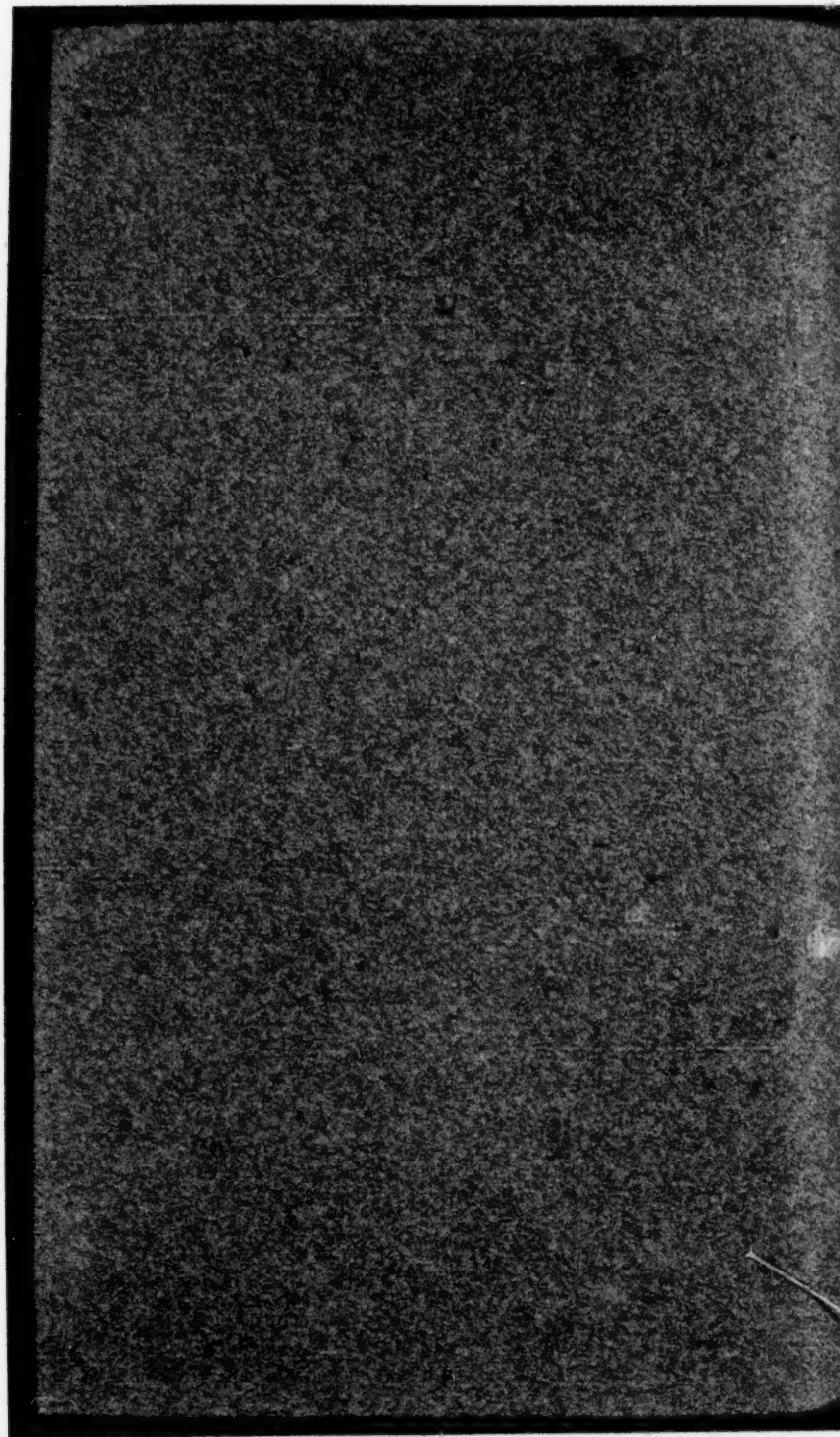
No. 36

**Pacific Gas and Heating Company, Appellant,
vs.
City and County of San Francisco and James H. Dwyer,
Mayor of said City and County, Respondents.**

**Attorneys for the District Court of the United States
and the National Bureau of Commerce.**

APPELLANT'S BRIEF FOR APPELLANT

Filed June 10, 1904
Insurance Building, Washington, D. C.
Oswald T. Spaulding



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IN THE
Supreme Court of the United States

OCTOBER TERM, 1923.

No. 34.

PACIFIC GAS AND ELECTRIC COMPANY, *Appellant*,
vs.
CITY AND COUNTY OF SAN FRANCISCO, *Respondent*.

No. 35.

PACIFIC GAS AND ELECTRIC COMPANY, *Appellant*,
vs.
CITY AND COUNTY OF SAN FRANCISCO, *Respondent*.

No. 36.

PACIFIC GAS AND ELECTRIC COMPANY, *Appellant*,
vs.
CITY AND COUNTY OF SAN FRANCISCO and JAMES ROLPH,
JR., Mayor of said City and County, *Respondents*.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES
FOR THE NORTHERN DISTRICT OF CALIFORNIA.

ADDITIONAL BRIEF FOR APPELLANT.

STATEMENT OF CASE.

These three cases were brought by the appellant to set aside three ordinances passed by the Board of Supervisors of the City and County of San Francisco, as being in violation of the Fourteenth Amendment to the Constitution of the United States. The first of

these ordinances fixed a maximum rate of seventy-five cents per 1,000 cubic feet of gas to be furnished within the City of San Francisco for the fiscal year beginning July 1, 1913, and ending June 30, 1914. The second and third ordinances fixed the same maximum rate for the two succeeding years, and in addition authorized a minimum rate of fifty cents per month to any consumer not using, during the month, fifty cents' worth of gas at the prescribed rate. All three cases were referred to a Master, who, after hearing a great deal of evidence, made an elaborate report in which he found that the rates attacked yielded a fair and just return upon the investment, and were therefore valid. The Court in its decision followed the Master's report, and it is from this decision of the Court that this appeal is taken.

STATEMENT OF FACTS.

In 1905 and prior thereto the San Francisco Gas and Electric Company was a public service corporation, engaged in supplying the inhabitants of San Francisco with gas and electricity. On January 2, 1906, the Pacific Gas and Electric Company, the appellant here, purchased over ninety-five per cent of all the issued stock of the San Francisco Gas and Electric Company, paying therefor \$90.00 per share, \$25.00 of this amount was paid in cash and the balance of \$65.00 in bonds of the purchasing corporation. These bonds, in 1912, were redeemed by the appellant at 105 per cent of their par value plus accrued interest. After the original purchase, appellant from time to time acquired additional stock of the San Francisco Gas and Electric Company at the same price until it had acquired over 99 per cent of the stock at this price. It continued to operate the property, however, under the name of the old corpora-

tion until 1911, when the plant itself was transferred to the appellant. At the time of the purchase of this stock there were bonds outstanding on the properties of the San Francisco Gas and Electric Company amounting to \$8,742,000.00 (Record, pages 1106-1107-1108).

The purchase of practically the entire stock of the San Francisco Gas and Electric Company by the appellant was in effect a purchase of the properties of that company. The total purchase price was \$90.00 per share for 158,484 1/3 shares of stock plus the mortgages on the property of \$8,742,000.00. The total purchase price was therefore \$23,005,590.00. The balance sheet of the San Francisco Gas and Electric Company shows that its gas properties constituted 66 1/2 per cent of the total value of its combined gas and electric properties (Record, pages 1093-1096).

Of this total purchase price, 66 1/2 per cent therefore is properly to be allocated to the gas properties, or \$15,298,717.00. So that in January, 1906, the appellant paid \$15,298,717.00 for the properties, the value of which is in controversy here. Subsequent to the purchase on January 2, 1906, and prior to June 30, 1914, appellant expended on this property for additions and betterment, \$7,591,593.35 and, during the same time, abandoned property because of ordinary depreciation amounting to \$888,609.36. In addition to this latter item, certain land formerly in use by the gas department had ceased to be used for such purpose. The value of this land was \$361,923.00 (Record, pages 1109-1110). On the eighteenth of April, 1906, barely ninety days after appellant had purchased this property, the great earthquake and fire occurred. This catastrophe caused the loss and destruction of portions of this gas plant amounting to \$2,038,563.00 (page 659, Record).

Some of this property had actually become obsolete, but the rest of the loss was directly due to the earthquake and fire.

So that, at the time of the Master's valuation, the total cost of these gas properties to appellant, after eliminating all abandoned and destroyed properties, had been as follows:

Original Costs.	\$15,298,717.00
Additions and Betterments	7,591,593.00
	<hr/>
	\$22,890,310.00
Less:	
Lands not further used.	\$361,932.00
Properties abandoned.	888,609.00
Properties destroyed.	2,038,563.00
	<hr/>
	\$3,289,095.00
Balance.	<hr/>
	\$19,601,215.00

This sum represents the cost to appellant of its San Francisco gas properties in use at the time of the Master's valuation.

The Master gave no weight to this evidence as to cost of the plant and proceeded to find its present physical value. This he did by determining the cost of reproduction for the various years involved and deducting accrued depreciation from this figure.

The following figures give the total value found by the Master for each of the years in controversy:

	1913-14	1914-15	1915-16
Total value	\$13,976,434.92	\$13,985,771.92	\$14,415,673.71
(Record, page 1192.)			

These figures opposite the words "Total Value" are the full amounts upon which the Master allowed a return.

The Master also found, from the evidence offered, that a return of seven per cent per annum was the lowest return that would give just compensation, and he, therefore, allowed a return of seven per cent per annum on the net value of the plant as determined by him, and being the amounts shown in the table above set out. The Master then determined that the rates attacked would in each of the three years have yielded more than the seven per cent return allowed, and were therefore valid.

In this brief I am calling attention to what I consider fundamental and vital errors of the Master, in arriving at the value of appellant's plant and in refusing to allow proper amounts for obsolescence. If I confine this brief to a few points which, in my judgment, require a reversal of these cases, it is not that I lack confidence in other points, but because such other points have been fully covered in the more elaborate brief of my associate, Mr. Bosley.

POINT I.

The Court Should Have Determined the Value of Certain Patent Rights from the Evidence as to Actual Value Instead of Adopting Cost as Value.

The facts concerning these patents are as follows: Mr. E. C. Jones and L. B. Jones, his son, the chief engineer and assistant engineer for appellant, had filed in May, 1912, applications for both an apparatus and a process patent for the manufacture of gas. Both of the applications were granted, the one for the apparatus on March 10, 1914, and the one for the process on

October 19, 1915. On November 30, 1915, the inventors granted to appellant the exclusive right to use these patents in certain counties in Northern California, including San Francisco. Appellant, however, had previously acquired a right to use these patents in San Francisco during the period in suit, by reason of having, with the patentees' consent, remodelled a certain old plant and installed a new one for the manufacture of gas by the new method. (Record, page 433.)

The formal contract transferring to appellant the right to use these patents, made in November, 1915, recited that the company had permitted the patentees to use the company's plants and facilities for experimentation and demonstration; that it had expended over \$100,000.00 in altering one of its plants and over \$215,000.00 in building an entirely new plant embodying the new inventions; that the great value of the patent had thus been demonstrated; that the company had allowed the patentees to exhibit these plants to numerous persons interested in the manufacture of gas, both in this country and in Europe, and that the privilege of future exhibitions was regarded by the patentees as of great value to them. The agreement then provided that the appellant should pay the patentees the sum of \$46,066.67 and would allow full opportunity for future exhibition of the patents. (Record, pages 432 to 436.)

The new plants embodying these inventions were in use to some extent during the latter part of 1912 and during 1913 and thereafter, and resulted in such a tremendous saving in the cost of manufacturing gas that new plants were constructed, embodying the new method, and the old plants, which were perfectly good plants but rendered obsolete by the new method, were scrapped.

After the installation of the new method, there was a saving both in labor and in amount of oil used. This saving was due solely to the new method. (Record, page 438.)

From the evidence offered as to the saving effected by the use of the new inventions, it is fairly deducible that during the fiscal year 1913-14 the saving amounted to \$103,530.39, during the fiscal year 1914-15 to \$132,419.45, and during the fiscal year 1915-16 to \$258,557.81. There was a larger saving in subsequent years, due to a fuller and more complete use of the patent. (Record, pages 438 and following, also Exhibit 62 at page 440. Also see Mr. Bosley's careful tabulation on page 136 of his brief.) Mr. Britton, general manager of appellant, estimated the savings that would be made during the sixteen remaining years of the patent at \$7,630,300.00. The worth of this saving on June 30, 1916, was \$4,203,300.00. (Record, pages 452 to 456, inclusive. See also Master's Report, page 1180.)

In addition to this latter figure there must also be considered the very large savings amounting to \$494,507.65 for the three years immediately preceding June 30, 1916.

In the face of this evidence the Master held that, in determining the value of appellant's plant, he could allow no value to the patents except the \$46,000.00 cash actually paid therefor. The Master, as one of his reasons for adopting the amount paid by appellant as the value of these patents, used the following language:

"If by the terms of their employment Mr. Jones and his son had been bound to assign their patents without further compensation, and had done so, the City could not justly claim that the Company should have no part of the savings effected. The

patents would have to be valued. But, in view of the fact that the Company and the patentees, dealing presumably, at arms length, have reached a figure of about \$46,000.00 as the value of exclusive rights throughout Northern California, I am as much embarrassed as was plaintiff's counsel in concluding that in San Francisco alone the rights are to be valued for purposes of return at \$4,000,000.00." (Record, page 1181.)

It is manifest that the parties to this contract were not dealing "at arm's length." The inventors were the engineers of appellant and had occupied that position for years. They had actual charge of the gas plants of appellant, and with these plants had conducted their experiments. An old plant had been remodelled and a new one constructed at a cost of over \$300,000.00 to try out these inventions. Such relations are almost as confidential as those of attorney and client. The Master was clearly wrong when he said of these parties, they were dealing at arm's length. But even if this statement were true, it could be no reason for adopting cost as value.

The Master recognized that these rights were worth much more than cost, for he says in his supplemental report:

"If the plaintiff had paid the inventors, say \$500,000.00, or other considerable sum, for these patent rights, there is no reason to doubt that this figure would have been accepted as the valuation for purposes of return." (Record, page 1228.)

If the company had paid a great sum for a patent of trifling value, the city could only be charged with the real value, notwithstanding the cost. So when the

company pays a small sum for a patent worth a great deal more, it is still the value and not cost that is controlling. The injustice of this finding becomes apparent when we consider that the Master, in valuing the physical properties of appellant, refused to allow the cost of the properties as their value, because, he said, the company "paid too much." (Record, page 1221.) He, therefore, gave no weight to the evidence as to the cost of the property to appellant, but proceeded to determine the value of the properties from the evidence of their reproduction value as distinguished from their cost. When, however, he came to value these patents, he rejected all evidence as to real value and adopted cost as determinative. It requires no argument to show that if he was right in the one instance, he was wrong in the other.

The Master, in considering the evidence as to the value of these patents, stated that this evidence was full of uncertainties because oil might rise so high in price that it could not be used to make gas, or other inventions might supersede those under consideration, and in either event the patents would thus become valueless. (Record, page 1181.) Of course, such a fate might possibly overtake any patent, but that would scarcely be a reason for denying all value to a patent that was actually saving almost half a million dollars yearly. I take it that the only proper course is to allow a return on the value as it appears at the particular time under consideration, and if the patent is in a later year superseded by a still more efficient patent or becomes worthless for any other reason, that then at such subsequent time it could properly be listed as of no value. But during all the years in controversy here these patents were of enormous value, and it can-

not possibly be fair to list them as of no value merely because some future contingency might possibly happen which would render them valueless. One might as well say that a building had no value because a future earthquake might destroy it, or that steel mains are of no value because some new kind of composition or concrete main might possibly be devised in the future that would be so superior to steel that all steel mains would become practically obsolete. I submit that such speculations as these are not the means by which values are to be determined.

The Master further says in his report :

“There is no doubt that these patents are property, and of great value. It is also true that justice demands that the utility company should profit in some substantial proportion by the economies brought about by its ability in management or its improvement in methods of manufacture. There is no good reason why the consumers should get all the advantages that are the fruit of the genius of these inventors.” (Record, page 1181.)

This is sound reasoning, but unfortunately the finding of the Master does not follow the reasoning. For he then proceeds to allow as the value of the patents only the \$46,000.00, the exact cash sum which the company paid for them. Allowing a return on the exact cash cost does not permit the company “to profit in some substantial proportion,” nor, indeed, in any proportion, in the savings. But on the contrary, turns over to the consumer “all the advantages” that are the result of these inventions.

The Court below fell into a curious error with regard to the evidence as to the value of this patent. The learned Judge says, regarding this evidence:

"The plaintiff acquired from its chief engineer and his assistant the exclusive right to use certain patented devices and processes in the city and county of San Francisco and other counties of North California, by the use of which the cost of manufacturing gas was materially lessened, and it claims an allowance of \$4,000,000 because of these acquisitions. A disallowance of the claim is the subject of another exception. The gas consumers of San Francisco have no concern with the exclusive rights thus acquired, even in the city and county, much less in other counties of the state. They are only chargeable with the reasonable cost or value of the right to use the devices and processes in the manufacture of gas in the city and county of San Francisco. * * * So here the rate of return should be based on the reasonable cost or value of the rights acquired for the purpose of manufacturing gas in the city of San Francisco and not elsewhere. The record affords no basis for such a finding, and under these circumstances the claim as made was properly rejected." (Record, page 1273.)

The evidence as to the value of this patent was confined exclusively to the appellant's operations in the City of San Francisco. The actual savings testified to were savings effected by appellant in manufacturing gas for the City of San Francisco alone, and the testimony as to future savings was likewise applicable to San Francisco alone. In fact, all the testimony as to value of this patent was particularly confined to San Francisco and was directed to the value of the rights in San Francisco alone. So that the learned Judge below was clearly mistaken when he held otherwise. (Record, pages 438, 452 to 456.)

Certainly a patent which saved over \$400,000 annually was worth much more than the \$46,000 paid

for it. In valuing the Assets of Appellant, the Master refused in every other instance to consider what Appellant had paid and determined actual value. Why is this particular asset so different from every other? If value and not cost is the criterion of Appellant's physical plant, then value and not cost should determine the value of these patent rights.

POINT II.

If There Be Objection to Fixing a Large Capital Value For These Patent Rights, Then an Annual Allowance for the Reasonable Value of Their Use Should Have Been Made.

The City is using the methods covered by the patent under an implied contract to pay the company the reasonable value of such use.

The City is in fact using appellant's entire plant under the same implied but valid obligation to pay each year the reasonable value of such use. The mains, the meters, the factories, are all being used in the same way and under the same obligation.

In exactly the same way are these rights being used for the benefit of the city under the obligation to pay the company each year the reasonable value of the use of such rights. If it seems objectionable to value these rights at \$4,000,000.00 for the reasons that the Master gave, *i. e.*, that oil might become so scarce or so high in price that the new method could not be used, or for the reason that new methods might be found which would supersede these, and thus render the patents valueless—if for these reasons, or any other, it seems objectionable to capitalize these rights at their full value, there can exist no objection to requiring the consumer each year to pay the value of the use of the

rights for that particular year. The value of such use can be determined with reasonable approximation from the evidence as to the advantages of the patents and the savings effected by their use.

The Suffolk Co. vs. Hayden, 3 Wallace 315;

Dowagiac Manufacturing Co. vs. Minnesota Plow Co., 235 U. S. 641.

Suppose the inventor himself had owned the gas plant, would justice be done by allowing as a capital charge the exact amount of the fees of the Patent Office together with other nominal charges, allowing nothing for the real value?

To allow appellant interest on only the bare cost of the patent means that the company must suffer the loss when it makes a bad bargain and can get no benefit when it makes a good one.

POINT III.

Appellant Was at Least Entitled to an Allowance Sufficient to Cover the Loss on Property Abandoned on Account of the Patents.

If it be held that under the evidence the Master was warranted in finding that a patent which actually saved \$494,507.65 in operation during the first three years it was in use, and was actually saving at the time of trial of the case over \$400,000.00 annually, was in fact only worth \$46,000.00, still there can be no justification for his failure to allow the actual amount of obsolescence caused by using this patent.

There were three plants affected by the new invention and which were during the years in controversy either abandoned entirely or to a very large extent, with the certainty of entire abandonment in the imme-

diate future. (Record, pp. 259-261.) These were good serviceable plants, but abandoned solely because the new invention rendered them uneconomical and therefore useless. These were plants upon which appellant was entitled to a return, and upon which it would have continued to be entitled to a return had the appellant not voluntarily replaced them by the new plants operated under the new method covered by the patents.

That it was good business from an economic standpoint for appellant to replace the old plants with new ones, operated by the new method, cannot be questioned. The entire loss from abandoning the old plants, after deducting their salvage value, was \$884,355.74 (Exhibit 77, pages 261 and 262; also pages 259 and 260, Record), and this was made up in two years by the savings effected by the new method after that method was in full operation. With such a saving an established certainty, the appellant, if it was to give any consideration to efficiency and economy, had no choice but to build the new plants and abandon the old ones. Any other course, from the standpoint of economical operation, would have been folly. Appellant should have been commended and rewarded for adopting this course, but instead it was actually penalized.

After the installation of the new plants, appellant was allowed in its operating expense only the actual cost of manufacturing gas by the new and cheaper method, the entire savings thus going to the benefit of the consumer, the company thus receiving no share whatever of the benefit of the new invention. It is true the company was allowed a legal return on the actual cost of the new plants, and the Master at least intended to allow a return on the \$46,000.00—the actual cost of the patent. But this is only allowing a legal return on

the actual new money invested and cannot be considered as giving the company any part of the benefits of the patent. But this is not the worst feature of the Master's ruling, for he not only refused to allow the company to share in the benefits of the patents, but he actually refused to allow it the obsolescence which the patents had caused.

Obsolescence Caused by Patents at Martin Station.

Let us first consider Martin Station, the largest of the three plants abandoned because of the new method. This was a new plant built in 1905 at a cost of over \$500,000.00. Its value June 30, 1914, was found to be \$495,760.40 (Record, p. 1126). This plant was entirely abandoned in 1915, and its value was eliminated that year from the value upon which a return was allowed appellant. The amount thus eliminated was \$495,760.40 (Record, page 1125.) It had been abandoned solely because of the new invention (Record, bottom of page 253). It would have been fair to have allowed appellant, by way of special obsolescence, the amount thus eliminated, but instead the Master allowed for obsolescence on this plant, for all the three years in controversy, a total of only \$147,389.00. The figures, by years, are as follows:

1913-14	\$56,957.00
1914-15.	59,805.00
1915-16.	30,627.00
	<hr/>
	\$147,389.00

(See page 176 of Mr. Bosley's brief and the stipulation at end of his brief that these figures are correct.)

After allowing for salvage, the net loss to the appellant on this plant alone was \$326,879.96. (See Exhibit 77, pages 261 and 262 Record; also pages 259-260.) As the Master, by refusing to allow any value to the patents beyond their actual cash cost, had awarded all the savings of the patents to the consumers, it is clear that appellant was entitled to an obsolescence on this plant for these three years of the full amount of its loss, or \$326,879.96, instead of the \$147,389.00 which it was allowed. Subtracting these figures, we find that appellant was entitled to an obsolescence on this one plant for these three years of \$179,450.00 more than it was allowed.

Obsolescence Caused by Patents at Other Plants.

In addition to the Martin Station, it was in evidence that still further plants would become entirely obsolete in the near future by reason of the new method.

The total amount of such obsolescence is clearly shown by Plaintiff's Exhibit 77 set out on pages 261 and 262 of the record, and by the evidence on pages 259 and 260. These amounts, after deduction for salvage, are as follows:

Martin Station	\$326,879.96
Potrero Station	199,132.13
Independent Station	318,343.65
	<hr/>
	\$844,355.74

As against this loss appellant was actually allowed a total of \$275,096.00 as obsolescence on all three of these plants for the entire period of three years. (See page 176 Mr. Bosley's brief and the stipulation, page 208 his brief, that these figures are correct.)

There was then an actual loss to appellant, caused by the new methods, of the difference between these two amounts. Subtracting we have:

Loss caused by obsolescence.....	\$844,355.74
Amount allowed by Master	275,096.00
Net actual loss.....	<u>\$569,259.74</u>

This latter figure is the net loss to appellant caused by adopting the new method over and above all allowances for obsolescence. The findings of the Master, which were adopted in the judgment below, denied to appellant:

- 1st—The real value of the patent rights;
- 2nd—All allowance for the reasonable value of the use of those rights;
- 3rd—An adequate allowance for obsolescence caused by using those rights.

The result of the finding and judgment is:

- 1st—The consumers are enjoying all the benefits of installing the new methods, amounting to over \$400,000.00 annually;
- 2nd—The consumers are paying nothing either for the value of the rights or the value of their use;
- 3rd—The company is getting no portion of the benefits of the rights and has actually lost over \$500,000.00 in obsolescence.

Even had appellant been allowed this extra \$500,000.00 as obsolescence, still it would only have been made whole on this innovation of adopting the new methods, and the consumer would still receive all the net benefit accruing therefrom.

If it be held that a company that is so alert in the interest of its patrons as to adopt new methods which save large sums in operation, cannot enjoy any of the fruits of the new methods, it surely is going beyond reason to hold also that the consumer is entitled to receive not only all the net advantage of the change, but also is entitled to receive over \$500,000.00 out of the assets of the company.

POINT IV.

The Master's Reasons for Refusing to Allow the Actual Obsolescence Are Unsound.

The Master gave five principal reasons for refusing to allow this obsolescence. These reasons are briefly as follows:

1. Appellant should have foreseen these losses and provided for them by reserves several years in advance.
2. Appellant actually did foresee these losses and actually did set-up reserves to cover them several years in advance.
3. These losses were past losses and cannot be made up out of present earnings.
4. Earthquake losses cannot be made up to appellant.
5. Appellant was not forced to adopt the new methods and therefore it must stand the loss.

I shall consider these reasons in the above order.

1st Reason: Appellant should have foreseen these losses and provided for them in advance.

The master says (Record, page 1168):

"It must be admitted that if replacement of an old machine has not been sufficiently provided for by reserves in advance, a company will naturally defer installing a new machine, and so progress is halted. It is, furthermore, true that the application of the usual formula, fair return on fair present value of the plant in service, gives to the consumer all the advantages of economies in operating costs, which plainly is not entire justice. The city's counsel agrees (Argument 451) that if obsolescence had occurred suddenly, with no opportunity to create reserves for replacement, the loss should be amortized after abandonment; but he denies that the facts here conform to the hypothesis.

"If the rate-fixing body had prescribed such a system in this case, this court would be justified in following it. (Kansas City Southern case, *supra*, p. 62); it is a matter of administrative or business policy concerning which the regulatory commission has the primary responsibility. But so far as appears, that has not been done. It is, therefore, the court's duty to pass on the justice of plaintiff's claims to reimbursement of past abandonments; and it is plaintiff's duty to convince the court by clear evidence, first, that it has not had such warning of approaching obsolescence as would have impelled a careful owner to accumulate a reserve for replacement; second, that it has not in fact built up such a reserve. I agree with the city that this burden has not been sustained."

Again he says, after reciting the history of the development and progress of the gas business (Record, page 1169):

"From this it is evident that the city's counsel is fairly justified in his comment that the obsolescence which latterly has operated to displace

water gas generators by oil gas generators, and the old oil gas process and machines by the improved Jones process and machines, has not been an overnight revolution, but rather an evolution evidenced by economic changes and technical experimentation and construction extending over a period of at least ten years between changes."

The only possible deduction to be drawn from this reasoning is that because in the past there had been improvement from time to time in the process of manufacturing gas, therefore the appellant was bound to know, at its peril, that the new Martin Station, built in 1905, would become entirely obsolete in 1915, and was bound, at its peril, to write off this new plant entirely and proportionately during the few years of its life, and to collect rates that would give it sufficient income to permit such writing off.

The allowance on Martin Station for obsolescence made by the Master for the three controverted years average slightly less than \$50,000.00 per year. It is therefore a simple mathematical deduction that he thought appellant should have begun to anticipate this obsolescence as early as 1908, for at the yearly rate allowed, a beginning must have been made in 1908 in order to wipe out the plant entirely in 1915, the date of its abandonment.

The Master then, following this curious line of reasoning, allows obsolescence on the three years in controversy exactly as if appellant had foreseen this obsolescence in 1908 and begun to write off the plant during that year in accordance with such knowledge.

This conclusion of the Master is entirely inconsistent with his statement on page 1168 of the Record as follows:

"Mr. Jones began his experiments which resulted in the improved process for making oil gas in 1912, and the two latest generators which embody the improvement were installed in 1915."

The Master also said of Martin Station:

"In 1905-6 this company bought a plant that then, and until about 1914, was modern in all respects." (Record, p. 1127.)

The refusal of the Master to allow the actual obsolescence can only be justified upon the theory that appellant was bound to know as early as 1908 at least, that in 1912 Mr. Jones would begin experimenting on a new method, and it was also bound, at its peril, to know that these experiments would be successful, and that the result would be that Martin Station, just finished, would become entirely obsolete in 1915.

The unreasonableness of this conclusion is submitted without further comment.

2nd Reason: Appellant actually did foresee these losses and did set up reserves to cover them in advance.

The Master says on page 1171 of Record:

"It seems quite apparent to me that the necessity for providing reserves for depreciation by obsolescence and inadequacy, as well as physical decay, could reasonably have been foreseen; that there is indication that it was foreseen and that provision for reserves against it was in fact made."

This conclusion he reaches because during the years 1908, 1909, 1910 and 1911, heavy charges on appellant's

books in almost exactly equal annual amounts were made to depreciation reserve. The net amount for the four years being \$2,116,433.95. (Record, page 1169.) But there had been a loss in 1906 of over \$2,000,000.00, due to the earthquake and fire (Record, page 660), besides a growing obsolescence, so that these large reserves were actually insufficient to take care of the loss and obsolescence already incurred at the time they were set up. It is a fantastic theory that these reserves were set up not to cover losses already incurred, but to cover obsolescence to be caused in the future by a patent not even thought of until years after the reserves were set up. The company had actually incurred these great losses, and it had a right to set up these large reserves to cover such losses.

During those years it had no excessive income out of which such large reserves could be set up. Its average income for these four years after the deduction of reserves, was \$303,372.93 (Record, page 672), or less than two per cent on the \$17,327,505.00, the value of its plant as shown by its balance sheet (Record, page 1093). If this value be objected to as too large, it is still apparent that, whatever reasonable value be given appellant's plant for these years, there was no excessive income out of which these large reserves could have been written, and therefore these reserves were not provided by the rate payers, but were provided at the expense of the stockholders of the Company in inadequate earnings. It must be certain that these reserves were set up for the purpose of taking care of losses already accrued, and not with the idea that they were to compensate for future losses. It would have been extraordinary and unreasonable for appellant to have kept its net earnings to less than two per cent to take

up possible future obsolescence. But with these large losses already established, it was a reasonable and proper thing to set up these reserves even at the expense of dividends.

It is true that the amount of these reserves were transferred to surplus on the books of the Company on November 27, 1911 (Record, page 1170). But that was merely a bookkeeping entry, and does not change the fact that these great losses had already been incurred, and that the amount set up to reserves and afterwards transferred on the books to surplus was not sufficient to cover such losses.

These reserves were merely a matter of bookkeeping. A stroke of the pen placed them on the books; another stroke of the pen could wipe them off the books. These entries, made years before the present controversy, could not have affected in any manner the value of appellant's property. What appellant was entitled to was a fair return on the value of its property as it existed at the time of the controversy. The Master did not use the books of the Company to find out that value, nor did he use the books of the Company in any manner to find out how much depreciation had accrued in order to determine that value. What he did was to take the evidence of engineers and experts as to reproduction cost, and also as to the amount of accrued depreciation, and his finding as to reproduction cost and accrued depreciation was based solely on such evidence. What difference can it possibly make what depreciation or what value was written on appellant's books years before? Suppose these amounts written on the books as depreciation reserves had been declared out in dividends during the years gone by, what difference could it make in the

present value of appellant's plant? It has been repeatedly held that the earnings of the past belong to the past, and the losses of the past also belong to the past. So here the inquiry is not what kind of book-keeping has the appellant done in the past, but the inquiry must be confined to the value of the appellant's plant at the time of the controversy and to the sufficiency of the return.

3rd Reason: These losses were past losses and cannot be made up out of present earnings.

In speaking of these losses, the Master said:

"It is, therefore, the Court's duty to pass on the justice of plaintiff's claim to reimbursement of past abandonments."

Again he said:

"We are interested only in the abandonments of recent years. If there were unrecouped losses caused by obsolescence in early years, they are helpful only as illustrations; they offer no guide for future prediction; and there is no obligation on the present generation to make those losses good." (Record, page 1168.)

This statement, as an abstract proposition of law, is undoubtedly sound, but its relevancy, as applied to Martin Station, is denied because there was no obsolescence other than ordinary depreciation until the new method was invented.

In the present case we are not claiming anything for losses that occurred in the past, but we are claiming for losses caused by obsolescence, which losses were incurred during the three controverted years by

reason of the adoption of the methods covered by the patents. The first experiment on these patents occurred in 1912. The methods were put into use to some extent in 1913, and thereafter a fuller use was developed as rapidly as possible. It has already been pointed out that this use caused the obsolescence of otherwise perfectly serviceable plants, and that this obsolescence was not caused at any previous time, but was caused during the exact years in controversy. How the Master could have thought that these losses occurred in prior years is incomprehensible, when the new methods which caused the losses were entirely unknown until the very years in issue.

In support of his position that depreciation and obsolescence must be provided for in advance, the Master cites the case of *City of Knoxville v. Knoxville Water Company*, 212 U. S. 1 (Record, page 1169; also pages 1159 *et seq.*), but in that case the court merely held that depreciation and obsolescence of the past could not be cared for in the present, and that such depreciation and such obsolescence must be taken care of at the time it occurred, and if the Company for any reason had failed to exact rates that would take care of such depreciation in the past, that that was its own loss, and that present rates could not be enhanced by consideration of these past losses. The Knoxville case holds that a company is entitled to the depreciation and obsolescence accruing each year as it occurs, and is authority for holding in this case that appellant was entitled to this actual obsolescence which occurred during the identical years in controversy.

4th Reason: Earthquake losses Cannot be reimbursed out of present rates.

The Master says on page 1171 of the Record, that in determining cost of production and rates the earthquake and fire loss should not be considered. Appellant does not contend that this extraordinary loss should be considered. Neither does its argument or position in this case require it to be considered. The value determined by the Master was based upon the reproduction cost of the actual physical properties in existence and in use, less depreciation. The losses that had occurred in the earthquake and fire seven or eight years before were not considered in any way, and there is no claim that they should be considered.

It is true that appellant suffered heavy losses in the earthquake and fire, but it is not true that appellant is in any manner asking that those losses be made up to it. What it is asking is that it be allowed to recoup losses occurring during the very years of the attacked rates caused by the adoption of new methods in 1913, seven years after the earthquake, and not connected in any manner whatever with the earthquake.

To allow appellant to recoup these losses caused by the patents does not cost the rate-payers anything because the amount of such losses many times over have been saved the rate-payers in the decreased cost of manufacture.

5th Reason: Appellant was not forced to adopt the new methods and therefore it must stand the loss.

The Master adds to his reasons against allowing appellant this obsolescence, and by way apparently of

clinching the argument, the following sentence (Record, page 1169):

“Furthermore, since 1905 the plaintiff has had a monopoly of the gas business in San Francisco and therefore has not been forced by competition to change its methods of manufacture.”

What this argument amounts to is this: Appellant could have ignored the new methods, because there were no competitors driving it so hard that it was compelled to adopt the new method in order to lower costs of production. It might have gone on with the old plants and continued to manufacture gas in the old expensive way, and if it had done so, it would have been entitled to its operation in the more expensive manner and would also have been entitled to a return on its old plants. Because, however, it has been so zealous in the public interest as to adopt the new method and thus lower tremendously the cost of production, it is not entitled to any share in the saving effected in operation, it is not entitled to a return on the value of its patent, which admittedly is many times what it cost; and while it cannot participate in the slightest degree in the large savings effected, it must nevertheless lose hundreds of thousands of dollars in the value of its old plants rendered obsolete by the new method. All the savings belong to the consumer and all the losses belong to the Company.

The Master recognized that in awarding all the savings of the new methods to the consumer he was not doing justice for he says in his supplemental report:

“When plaintiff’s counsel says, at page 33 of the objections, that the Master’s report in effect

results 'in taking from the plaintiff and giving to its consumers the benefit of all economies and savings in the matter of administrative expense effected by the plaintiff through the operation of its San Francisco gas properties and business in connection with its other properties and business, and also the benefit of the economies and savings effected by plaintiff by its acquisition and use of the patent rights hereinbefore mentioned,' there is pointed out one respect in which the law on this subject-matter as administered by the courts seems to work injustice. It is not clear, however, that it works confiscation within the meaning of the Constitution and the decisions upon the subject-matter. An administrative board fixing rates ought to consider such matters as this and make allowances therefor. But I know of no way in which a court may do so, and if the situation can be solved, it must be solved by wiser heads than mine." (Record, page 1229.)

The Master, having admitted the injustice of his decision in awarding all the savings of the new method to the consumers, then proceeds to work a still greater injustice by refusing to allow the actual obsolescence caused by the new methods. In spite of the Master's pathetic statement that it would require a wiser head than his to right such an injustice, it does not seem that any great amount of wisdom was required to allow appellant something for the right to use the patents or to allow it at least the actual loss caused by the patents.

POINT V.**The Item of Paving Over Mains Was Improperly Excluded from Value.**

In determining the value of appellant's plant, the Master rejected an item of \$612,000.00 for pavement over mains. This item represents the cost that a new company or the city itself, if it undertook to duplicate appellant's plant, would incur in cutting through and relaying pavement laid down since appellant's mains were installed. As these mains were in place when this pavement was laid, this expense was not actually incurred by appellant's predecessor, which was the company that actually laid the mains, and for that reason was rejected by the Master. In determining the value of appellant's plant, actual cost figures were rejected, the value being determined by cost of reproduction less accrued depreciation. The Master said that he could not consider what appellant had paid because "The purchasers paid too much." (Record, page 1221.) If cost of reproduction is the proper method of determining value, then that method ought to be followed consistently and not departed from when such method happens to give the company an advantage. It is manifestly unfair to reject appellant's cost as determinative of value and at the same time eliminate an admitted item in the cost of reproduction on the ground that such item had not actually been of any cost to appellant. If *actual* cost is to be rejected when it is *more* than reproduction cost, then it should also be rejected when it is *less* than reproduction cost. It requires no argument to show that if reproduction cost is the test when it is less than actual cost, it ought still to be the test when it is more than actual cost.

The Master recognized the force of this argument and in addition found that the pavement was a benefit to the mains and increased their value. (Record, page 1134). He would have allowed this item of \$612,000.00 except for the decision in the Des Moines case, 238 U. S. 171. (Record, pages 1134, 1135.) But the Des Moines case is clearly distinguishable from the case at bar for the reason that in that case no cost had been incurred by the company for the pavement, while in this case the company had actually paid the amount involved when it purchased the plant from its predecessor. It will be recalled that it was this purchase that the Master criticized when he said the appellant "Paid too much." But he did say that this item of \$612,000.00 was included in the purchase cost. I quote from the Master's report at page 1220:

"I have excluded from capital the items of paving over mains and duplicated mains. Both these items are undoubtedly represented in the purchase cost." (Record, bottom of page 1220.)

So we have here an item of \$612,931.61 (Record, page 1133), which the appellant actually paid and is therefore included in its cost, and which would also necessarily be incurred by anyone reproducing appellant's plant, and yet notwithstanding this the Master excluded it under the mistaken idea that he was required to do so by the decision of this Court in the Des Moines case.

POINT VI.**The Master Did Not Allow Sufficient Value for Going Concern.**

In valuing a public utility for rate fixing purposes, an allowance for "going concern" has consistently been adjudged proper.

This is allowed because it is recognized that it costs something in addition to the actual cost of the physical structures to secure patronage and develop a business. If a company had a new and perfect plant for supplying gas to the inhabitants of a city, the plant being just ready to operate, it would manifestly cost something to persuade a sufficient number of inhabitants to purchase gas to make it a profitable business. This cost of securing patronage is a legitimate capital expense and properly allowable.

Des Moines Gas Co. vs. Des Moines, 238 U. S. 153.

Lincoln Gas Co. vs. Lincoln, 250 U. S. 266.

Denver vs. Denver Union Water Co., 246 U. S. page 191 of Opinion.

When, as in this case, the cost to the company is eliminated as a factor in determining value and reproduction cost is adopted as determinative, then reproduction cost should be consistently followed. In this case expert evidence was given by Mr. Ryan that, in addition to the cost of the physical properties of appellant, it would cost \$2,400,000.00 additional to develop the business which appellant had developed. (Record, pages 466-472.) This was not evidence of past losses, which was rejected in the Galveston case, but was the testimony of a duly qualified engineer as

to what it would actually cost to develop such a business. This evidence of Mr. Ryan was supported by the testimony of Mr. Cory, another engineer, that these figures as to reproduction cost of developing the business had "been determined from assumptions as close to actual facts as they can be." (Record, page 533.) Mr. Britton, the manager of appellant, testified that these figures as to the reproduction cost of developing the business were entirely too low. (Record, pages 548-550.)

By other methods the above and other witnesses fixed the value of "going concern" at much larger figures.

That the above so-called "reproduction" method of determining cost of developing business and so ascertaining "going concern" value, is the correct one is clearly indicated by the decision of this Court in the Galveston Case, 258 U. S. 388.

In that case the Court recognized that initial expenditures for "securing patronage" were proper. But the only evidence offered to support the finding as to "going value" was evidence of *past losses in operation*. No evidence was offered as to the costs of developing the business into a financial success or as to the costs of securing business, nor as to what would be the reproduction cost of developing the business, but the evidence was solely confined to past losses in operation. No wonder the Court said "Going concern value and development cost, *in the sense in which the Master used these terms*, are not to be included in the base value."

But this case cannot be held to overrule the long line of previous decisions that value for going con-

cern, when supported by proper evidence, is an item of value to be considered in rate fixing.

If we are to be consistent in ignoring original costs as determinative of value and in adopting reproduction cost as decisive, then we must determine the value of "going concern" by the same method. What it actually cost the company is of no interest, no more than is the actual cost of the physical properties. Neither is it of any concern whether such original costs have been restored to the company any more than if the company had had such a profitable business in the past as to have recovered the entire cost of its original plant. The profits or losses of the past are immaterial. What we must determine is the present value of the plant, and that we do by determining what it would cost to reproduce the plant and deduct therefrom accrued depreciation. So likewise to determine going value, we must determine not what it cost originally to develop the business, not what the original losses were while the business was being developed, but what it would now cost to reproduce or to develop the business. This was exactly the evidence that Mr. Ryan offered, supported by Mr. Cory and by Mr. Britton. There was no evidence whatever to the contrary, and the Master was not justified in rejecting this evidence and substituting a lower figure. This evidence, in the absence of anything to the contrary, was controlling and binding, and the Master was bound to follow it.

The minimum value that the Master could have found from the evidence was \$2,400,000.00. He actually did find \$1,500,000.00. A review of the Master's report shows that he would have allowed a larger amount, had it not been that in a previous case he had

allowed \$3,400,000.00 to the Spring Valley Water Company for going concern value and the District Judge had cut this value down to \$1,400,000.00. (Record, page 1187.)

It must also be remembered that this plant, the total value of which the Master placed at about \$14,000,000.00, had actually cost appellant over \$19,000,000.00. This discrepancy fairly indicates that appellant had considered that the going concern value was much larger than the Master allowed, and had actually paid a much larger sum for it.

Concerning this the Master said:

“Obviously purchase cost figures, like those submitted, tend to show that the purchasers were willing to pay more for the established business than I have allowed.” (Record, page 1221.)

In this instance, again, appellant is neither allowed what the item actually cost, nor what it would cost to reproduce. It is clear that appellant paid much more than the amount allowed. It is also clear that to reproduce the business as a going concern would cost in excess of \$2,400,000.00. But the Master rejects cost because appellant “paid too much,” and then arbitrarily reduces reproduction cost by over \$900,000.00, apparently because he had been criticized for making too liberal an allowance in a previous case. (Record, page 1187.)

POINT VII.**A "Non-Confiscatory" Rate and a Rate That Yields "Just Compensation" Are One and the Same Thing.**

The Master made the following finding as to the rate of return:

"I find that the minimum fair return that plaintiff was entitled to earn was seven per cent a year." (Record, page 1200.)

Counsel for respondent contended below and contends here that even a six per cent rate would not be confiscatory. There is apparently a misunderstanding in counsel's mind as to the meaning of the word confiscatory. The word "confiscatory" as used in cases of this character merely means any rate that is less than "just compensation." It matters not how small the deficit, if a rate does not yield the full measure of "just compensation" then it is "confiscatory."

The Constitution of the State of California, in common with other State constitutions, provides that private property shall not be taken for public use without "just compensation." The Fourteenth Amendment to the United States Constitution provides that no state shall deprive any person of property without due process of law nor deny to any person within its jurisdiction the equal protection of the law. These provisions of the United States Constitution mean that no state can take private property for public use without "just compensation."

In Railroad Commission Cases, 116 U. S. 307, page 331 of the Opinion, Chief Justice Waite said:

"The state cannot require a railroad corporation to carry persons or property without reward, neither can it do that which in law amounts to taking private property for public use without *"just compensation."* (Italics mine.)

See also *Chicago, Burlington & Quincy Railway Company vs. Chicago*, 166 U. S. 226, pages 233-241 of the opinion;
Smyth vs. Ames, 169 U. S. 466, pages 522-526.

This principle is so well settled that I refrain from citing other cases. We have then the established principle that rates to avoid the prohibitions of the Fourteenth Amendment to the Constitution must be such rates as will yield *"just compensation."* And any rate that does not yield *"just compensation"* is confiscatory.

What then is the meaning of *"just compensation?"* This term is well defined. There is nothing ambiguous or uncertain about it; it has a certain definite court-determined meaning. *"Just compensation"* means the *"full and perfect equivalent"* of the property taken.

Seaboard Air Line Railway Company vs. United States, 261 U. S. 299, and cases there cited.

As applied to rates, then, this term means such rate as will yield a *"full and perfect equivalent"* for the use of the property appropriated to public use or for the commodity taken for the public. It must necessarily follow that any rate that yields less than this *"full and perfect equivalent"* is confiscatory.

From the evidence offered it seems that the Master should have found that appellant was entitled to eight per cent return (Master's Report, Record, pages 1200-1214), but he did find that *"minimum"* rate to which

appellant was entitled was seven per cent. If this is the "minimum" rate, anything less than this would not be "just compensation."

As was said by the Court in the case of *Spring Valley Water Works vs. San Francisco*, 165 Fed. Rep., page 678 of the Opinion:

"To say that a body of rates which affords some compensation but something less than a reasonable compensation is not confiscatory, is simply to say that the Constitution protects a portion but not all of a man's property."

It is, therefore, established law that any rate that does not yield the full measure of "just compensation" is repugnant to the Fourteenth Amendment to the Constitution and therefore void.

SUMMARY.

1. The Court should have allowed a value for the patents in accordance with the evidence, or;
2. The Court should have allowed a reasonable annual charge for the right to use the patents;
3. Having allowed no value for the patents, and having allowed nothing for the right to use the patents, the Court should have allowed as charges the actual obsolescence caused by the patents;
4. The Court should have found a larger value for "going concern," and should have allowed a value for the item of "pavement over mains."

CONCLUSION.

It is respectfully submitted that the ordinances complained of were invalid and that the judgments appealed from should be reversed.

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